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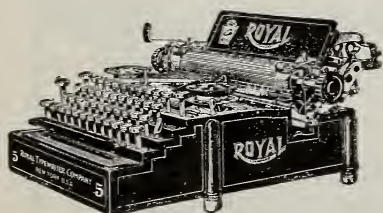
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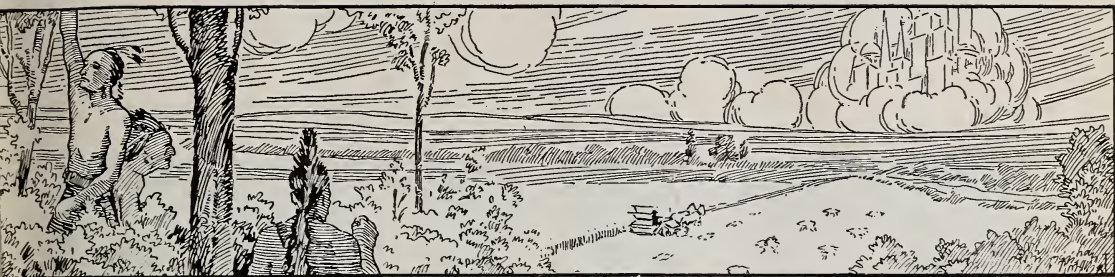
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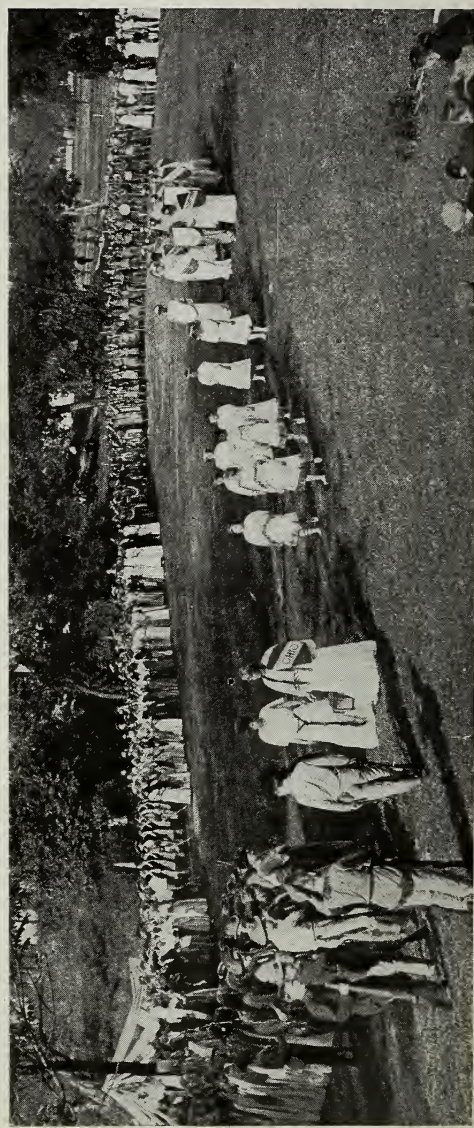
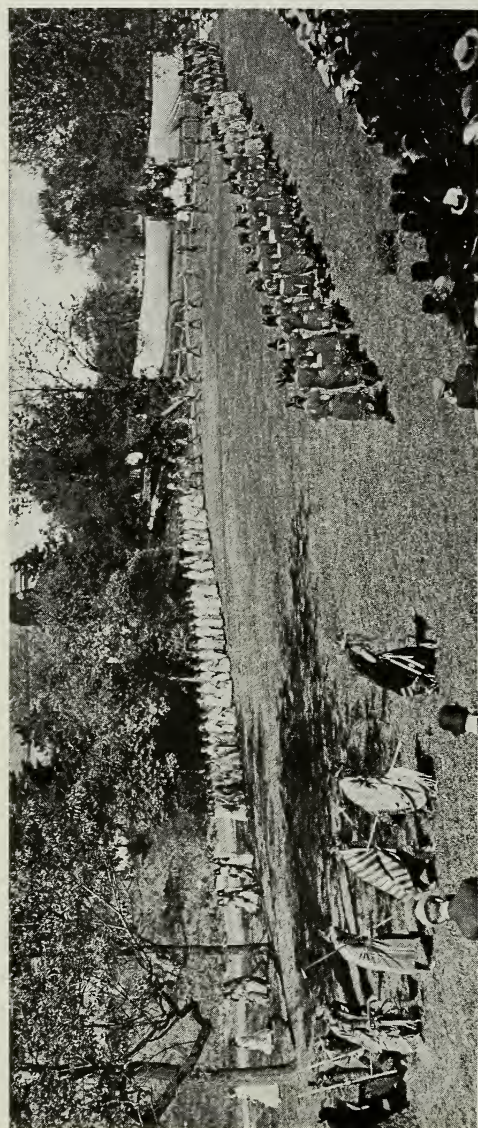
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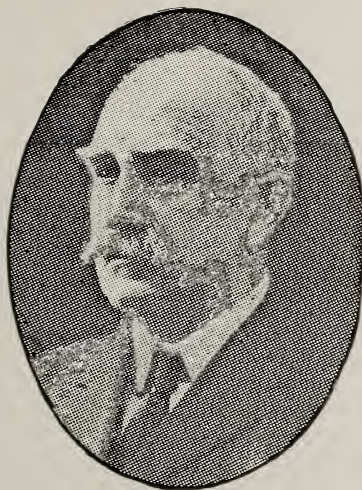


THE AGRICULTURAL STUDENT

Vol. XIX. OHIO STATE UNIVERSITY, COLUMBUS, SEPTEMBER, 1912 *Number 1*

IT is peculiarly fitting that this, the one hundredth anniversary of the founding of Ohio's capital at Columbus should be made the occasion for a special centennial issue by one of our magazines devoted to the advancement of Agriculture. Certainly no line of endeavor within the borders of our state has ever occupied the attention of a greater number of our citizens than has Agriculture, and surely none has made more persistent or greater advances during the century that has passed.

From the time of the early clearing of the hardy pioneers down to the present day of broad expanse of fertile fields, agricultural methods and agricultural conditions have been constantly and steadily improving. The State Department of Agriculture with its numerous officers controlling the legal phases of all agricultural affairs, the Experiment Station and sub-stations developing scientific facts and methods, the complete and deviously ramifying system of public instruction headed by the State College of Agriculture and ending only in the lower grades of the smallest rural school under the supervision of the State School Commissioner—all are but details of the wonderful development which the march of progress has evolved.



HON. JUDSON HARMON
Governor of Ohio

It is however, only within the last decade that the full significance of this movement has become apparent—that the wave of agricultural prosperity has rolled high toward its crest and has finally revealed to us in our modern rural homes the state's real strength and wealth. With the myriad, powerful forces at work, all aimed toward the development of this primal occupation, one

can but conjecture to what height of perfection our next centennial will find it advanced.

The present day seems to hold nothing but profit and pleasure for the fortunate farmer who resides lord of his quarter section. Land values must inevitably rise co-ordinate with the rise of food values. As our tillable areas become more and more restricted and subdivided, the growing multitudes of our already teeming cities must become to a greater and greater degree dependent upon the farmer. Surely there can be no diminution in the prestige to which the agriculturist has attained in the past decade—rather will this esteem grow until the farm is universally and rightly considered a factory, pure and simple, and the occupation a business in every sense, albeit requiring the added skill and knowledge of a profession.

JUDSON HARMON.

What the Next Decade Will Bring to Ohio Agriculture

A. G. McCALL
Professor of Agronomy

IT is difficult to estimate in bushels of corn, wheat and oats, tons of hay or numbers of live stock, what the next decade will bring to Ohio Agriculture. That there will be an increase in both quantity and quality, no one will doubt for a moment, but any attempt to make a quantitative estimate would be mere speculation. With all of the forces which are now in operation for the betterment of agriculture it would be strange indeed, if the next decade did not bring at least some measure of practical improvement to the farms of Ohio and the country at large.

But the most important contribution which the decade will bring to agriculture will be the great body of young men who will leave our agricultural colleges with a practical knowledge of the fundamental principles underlying the practice.

During the first decade of the new century our colleges have experienced many changes in the form and character of their work and during this period they have sent out a large number of men trained in agriculture. The efforts of many of these men for the betterment of agriculture have not been felt on the farm because they have been absorbed in experiment station research and in the training of others in our colleges. It is to be hoped that the new decade will see our graduates returning to the farm in larger numbers than ever before. There they will be in position to

exercise a direct and positive influence upon the community and put to test the practical efficiency of a college education and training. The public is demanding as never before that our state and federal supported institutions demonstrate their ability to train men and women for every important and useful duty which will be required of them. While there is no justification for an education which does not give to its possessor a greater practical efficiency it is necessary that we guard against the growing tendency in our agricultural colleges to graduate men in special lines of work and send them out without the training necessary to develop a successful and useful citizenship in the broadest sense. With a more even balance between the supply and the demand for teachers and research men the next decade will see an increasingly larger number of college trained men going back to the farm and demonstrating to the commonwealth their ability to perform the practical duties of citizenship.

The College of Agriculture of the Ohio State University will continue to justify its existence by helping to supply the demand for research men and teachers and by sending back to the farms of Ohio in larger numbers than ever before, young men trained in the theory and practice of agriculture and at the same time educated for better citizenship.

The Home of the Jerseys

ALFRED VIVIAN, Ph. G.

Head Agricultural Chemistry Department, Ohio State University

(Prof. and Mrs. Vivian are making an extended tour around the world.)

THERE is something wonderfully fascinating about the Jersey cow. Once the love of her gets into the blood it is hard to eradicate. One imagines he is off with the old love only to find that there are moments when it returns with compelling force.

Once upon a time, as the stories say, the writer was interested in a small herd of Jerseys. That was before the day of

"points." When one undertook to trace back a pedigree through sire and dam, sooner or later he came to the words "imported from the Island of Jersey," and there the record ended. What wonder, then, that one should dream of this island, whose reputation was so well established in the world of animal breeders that no other guarantee of purity of blood was demanded



JERSEY COWS ON THEIR NATIVE HEATH.

agricultural colleges, and also before the days of advanced registry and the omniscience of the Babcock test. It was also in the days when escutcheons were studied, and thereby was foretold the future milk producing power of the as yet unmilked heifer. The study of pedigrees was just as absorbing in those days as it is at the present time, even if there were no recorded yields of butter fat, and the breeding was for

than the fact that the animal was raised there! This island which has done so much for the dairy world is quite as fascinating as the cattle it produces, and one hesitates to write of it while yet breathing its atmosphere, lest he be led into an undue use of superlatives.

Jersey is the largest of the group known as the Channel Islands, which includes in addition the islands of Guernsey, Alderney, Sark, Herm, Je-

thou, and a number of others which are not more than rocky points. Geographically these islands belong to France, although they have been in the possession of England for over eight centuries. Jersey is only sixteen miles from the coast of France and is nearly seventy miles from England. The inhabitants are largely of Norman French descent and the vernacular language of the island is still old Norman-French. Most of the people speak English, al-

rugged. The many rocks and the uncertain tide make the coast unusually dangerous. "In all the world there is no coast like the coast of Jersey; so treacherous, so snarling; serrated with rocks seen and unseen, tortured by currents maliciously whimsical, encircled by tides that sweep up from the Antarctic world with the devouring force of a monstrous serpent projecting itself toward its prey."

The approach to the islands in the



ONE OF THE MANY BEAUTIFUL LANES ON THE ISLE OF JERSEY.

though many are still to be found in the country districts who shake their heads when addressed in English, and ask, "Parle vous Francais?"

Jersey is about twelve miles long and from three to six miles in width. Roughly speaking, it may be said to contain sixty-two square miles, or thirty-nine thousand five hundred and eighty acres, of which about twenty-five thousand are cultivated. The underlying stone is almost entirely granite and the coast line is extremely

steamship from Weymouth, England, is a sight never to be forgotten, so striking is the contrast between the rugged granite walls and the greenest of verdures with which they are crowned. When once on land the grandeur of the coast is somewhat eclipsed by the softer beauty of the pastoral landscape. Surely nature has been lavish with Jersey, for where else does vegetation so luxuriate as here? A good soil, abundance of moisture, a temperate climate, all unite to produce a wealth of foliage

impossible to describe, and everywhere trees and grasses and flowers grow in riotous profusion. Plants which in America are known as potted plants only, here grow outdoors almost the entire year. Fuchsias are to be found as large shrubs five and six feet tall and geraniums trained against the wall reach the second story window. In brilliance of color they far surpass those grown across the water.

Good roads are found everywhere, for they are built of granite and are scrupulously cared for, even to being swept by hand almost daily. The roadsides are planted with hedges and elms, the latter arching over in many instances to form a complete canopy—a delight to the eye, but the bane of the photographer. When the shade is too dense for flowers the hedges are formed of ferns and ivy, and in many cases the trunks of the trees are completely encircled by the clinging ivy.

But what about the cows, someone asks? They are here also—eleven thousand odd beauties. There are few large herds in Jersey. Most of the farmers have small holdings. The largest farm in the island belongs to Mr. J. A. Penée, Secretary of the Royal Agricultural Society, and it contains only sixty-five acres. Some of the holdings are as small as four acres, the average size is apparently about twelve to sixteen acres. A buyer cannot purchase more than one or two cows from any one farm, but as only one breed is to be found on the island he really has a large number to select from after all. Perhaps the Jersey man's success in breeding has been due partly to the fact that he possessed such a small number of individuals. He certainly has an intimate acquaintance with his cows and one of the prettiest sights is the affection displayed between the cow and her

owner. Wasn't it ex-Governor Hoard who once said, "Speak to a cow as you would to a lady?" Well, the Jersey farmers follow that advice to the letter.

Every precaution is taken to maintain the purity of the breed. No animal can be imported to the island except for slaughter and under the most stringent supervision. It is said that every fat ox shipped in from England during the Christmas holidays is sold five times over, and no one is refused a piece of it no matter how many pounds have already been sold.

The registration rules are also very rigid. Within twenty-four hours after the calf is dropped a certificate must be signed to that effect by the owner and one other, and the registration must take place within eight days thereafter. Before the animal receives a number and is "qualified" it must be examined by a committee of the Agricultural Society, when it is reported commended (C.) or highly commended (H. C.) Examinations of heifers take place after dropping the first calf. In the case of bulls the examination takes place when the animal is one year old, and his dam must be exhibited with him if the dam is on the island. Only such animals as have been regularly examined go into the herd book.

Up to the present time no work corresponding very closely to the advanced registry plan in vogue in America has been carried on here. An attempt is soon to be made to start something of the kind, but the officials of the Society feel that they are handicapped by having no agency like the Experiment Stations to control the work. They realize that it will be necessary to devise some scheme of control which will place the reported tests above suspicion, and that it is no easy problem for them to solve. A more courteous lot of gentlemen than

these breeders would be hard to find, and there is no doubt that the majority of them are conscientious in their desires to do everything possible to improve the breed.

Probably most American farmers, if they think of Jersey at all, imagine that raising cattle is the sole occupation of the islanders. It may surprise many to know that the income from animals and animal products is a rather insignificant part of the gross income of the Jersey farms. The principal money crop of the island is the early potato. These potatoes are planted in February and are ready for the English market in April or May, and consequently command a high price. One man stated that he sold the potatoes from four acres for seventeen hundred and fifty dollars this year. In some cases the farmers practically said that they kept the cattle because they needed them to maintain the fertility of the soil. Near-

ly all the manure is used on the potato ground and, in addition to this, from two-thirds to one ton of a high-grade fertilizer per acre. Much of the liquid manure is collected separately and used on the grass land.

Two crops yearly are always produced on the same ground and in some cases three. In the eastern part of the island potatoes are commonly followed by tomatoes, which are all pruned to single stems and tied to stakes. Both potatoes and tomatoes have to be sprayed to prevent blight, which is prevalent here. Early tomatoes are also grown under glass, but no artificial heat is required.

The climate is so favorable to floriculture that only her distance from the markets prevents Jersey from becoming an important factor in the cut flower trade, for her beautiful flowers, perhaps, prompted Victor Hugo to call her, "A lovely garden of the sea."

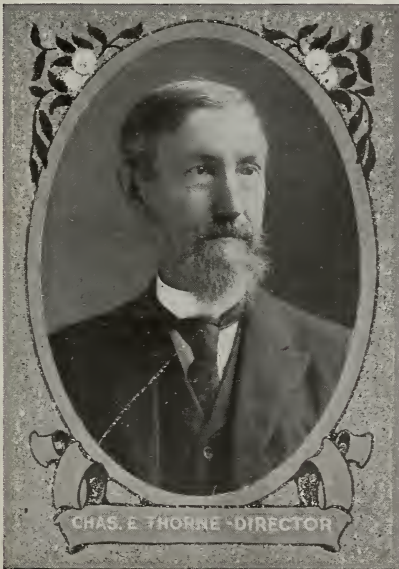


FAUVIC'S ROSE,
The Island's Prize Two-Year-Old.

What the Ohio Experiment Station Is Doing for the Ohio Farmer

CHAS. E. THORNE
Director Ohio Experiment Station

THE Ohio Experiment Station was the fifth institution of its kind established in America, and it was itself an experiment the first ten years of its history, having to grope its way through an unexplored field of work. During this period some of the limitations of experimental research in agriculture were learned, while glimpses were obtained of some of the opportunities for such research.



From its first organization the Ohio Station has devoted its chief energies to field work, believing that the most pressing need of our agriculture is the adaptation to the actual conditions of the farmer on his farm of the discoveries of modern science, and remembering that the average farmer has as yet had little opportunity to secure the training necessary to enable him to make these adaptations for himself.

One of the first lessons learned during the first decade of the Station's history was the importance of uniformity in soil conditions and of permanence in plan and continuity of work in the study of the problems relating to the maintenance of soil fertility, and the opportunity which came to the Station at the close of this period to re-locate on a soil selected in the light of this earlier experience—an opportunity which few similar institutions have had—has contributed very largely to the success it has attained.

The second decade of the Station's history was one of readjustment and conservative expansion of work; but it had ceased to be an **experimental** station. By the close of this period this fact was generally recognized, and during its third decade it has become, we believe, thoroughly established as a permanent factor in the agriculture of Ohio.

From its first organization the study of the problems relating to the maintenance of soil fertility has been a prominent feature of the Station's work, and it was realized at an early date that this study could not be successfully pursued on a single type of soil, nor through desultory tests, made for a single season or even through several seasons. Hence it has been the Station's policy to establish permanent test farms on typical soils and to institute on these farms a line of soil investigations planned to articulate with those at the main station and to be continued indefinitely.

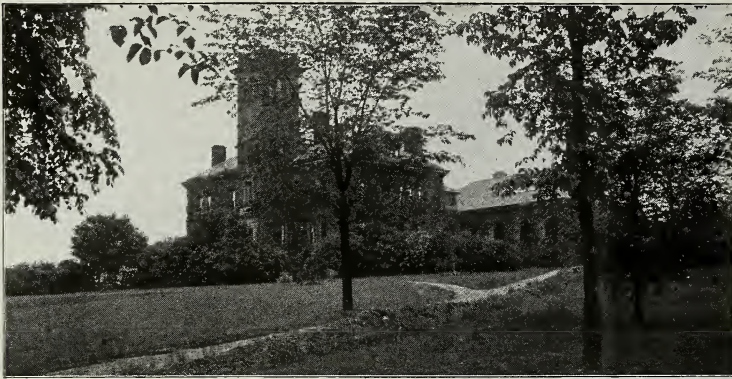
This policy has resulted in the establishment to date of eight district and county experiment farms, scattered over

the state, and bringing under the permanent control of the Station as many soil formations. Several of these have been established within the last two years, under the county experiment law, but the three district farms in Cuyahoga, Montgomery and Meigs counties have been in operation from 10 to 17 years, and have contributed materially to the establishment of a foundation on which to build a safe and conservative practice in the treatment of the soil.

With this equipment the Station is in position to give advice in respect to the

ing the work to orchards leased for the purpose and to others whose owners have co-operated in the investigations, and the outcome has been that the leading orchardists of the state have adopted the methods thus worked out and have demonstrated the practicability of producing apples in Ohio with as much certainty and of as fine quality as in the pioneer days when a failure of the apple crop was unheard of.

In the feeding and care of livestock the Ohio Station has conducted investigations from its first organization and



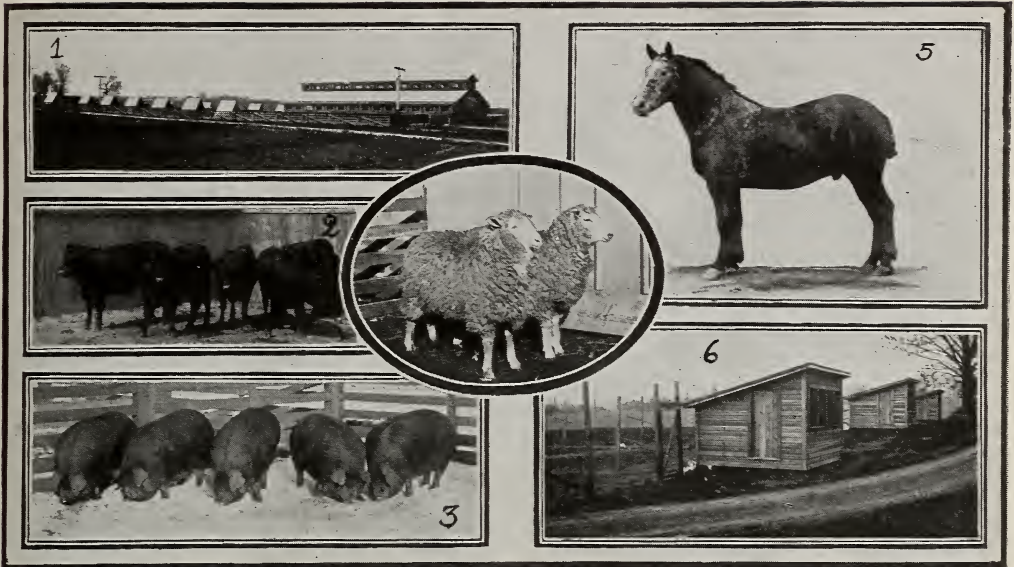
MAIN BUILDING AT OHIO EXPERIMENT STATION.

treatment of the land based upon an experience covering a considerable range of soils and extending over many years, during which different combinations of fertilizing materials have been used on crops grown under conditions of exact knowledge as to the quantity and composition of the fertilizer and the amount of the increase produced, an experience which is being widely extended through the county experiment farms, now coming under the Station's control.

The study of the orchards of the state and of the factors limiting their usefulness was begun simultaneously with that of the soil problems, and has been pursued without intermission, extend-

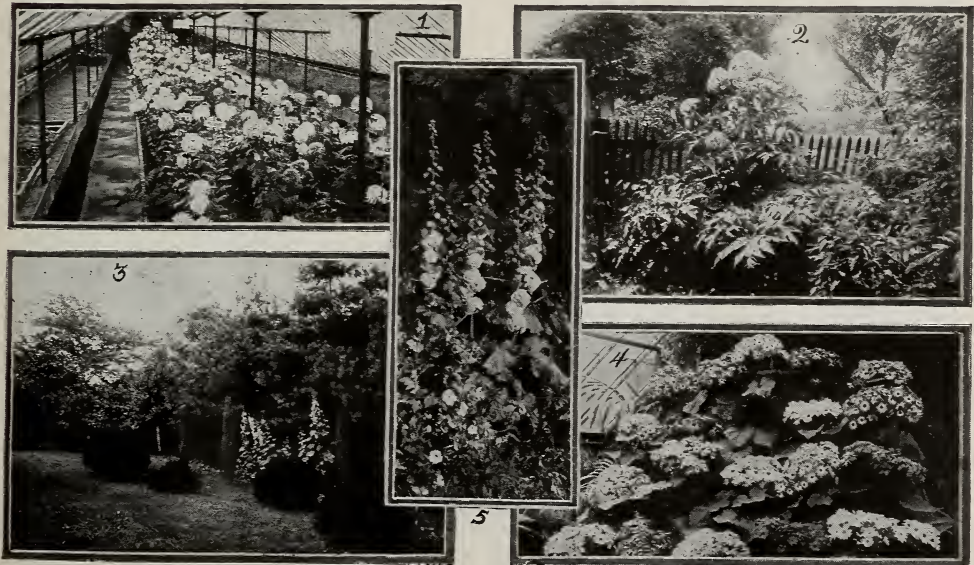
ing in this, as in other departments of the farmer's work, it is able to offer advice based upon long continued experiments in which the food has been carefully weighed and its composition determined and the increase ascertained.

The first staff of the Station consisted of a Director, who was also a professor in the State University and whose time was chiefly occupied in professorial work; a chemist; a botanist; a superintendent of field experiments, and one or two laborers, and it occupied about 30 acres of land belonging to the University. The present staff includes twelve Department Chiefs with 60 scientific and expert assistants, including twelve chemists, seven botanists and four en-



1. Feeding Building and Pens.
2. Young Stock.
6. Hog Colony Houses.

3. A Few of the Hogs.
5. A Promising Drafter.



Plant Breeding and Fungus Disease Investigations Require Much Greenhouse Space.

tomologists, with more than 100 laborers, and it owns or occupies under permanent lease more than 1,500 acres of land. These figures are given as evidence that its work has been found helpful by the people of the state.

This work, however, is really only beginning to bear fruit. Here and there is a farmer or fruit grower who is profiting by it enough to demonstrate beyond possibility of contradiction the correctness and adaptability of its advice—but the mass inertia of the farming population as a whole has not yet been overcome, nor will it be until our farms shall be managed by young men who have had that training in the principles and applications of science

which the College of Agriculture is giving, either directly, or by training teachers to carry further the work.

The first Botanist of the Experiment Station was the first graduate of the Agricultural Department of the University during the first ten years of its history—a department which comprised but a very small part of the institution as a whole. Today the College of Agriculture is the largest department of the University, and unless I wholly misinterpret the signs of the times it will permanently maintain this position.

In the young men whom this college is training, and in those whom they in time shall train, lies the hope of the agriculture of Ohio.



AT WORK AT THE WOOSTER STATION.

One Hundred Years of Agriculture in Ohio

O. M. KING

ONE hundred years ago Ohio really had no agriculture worthy of the name. To be sure, the Indians scattered here and there over this wide domain annually scratched up small plots of dirt and carried on some semblance of corn culture. And even at that early date a few hardy pioneers had established themselves along the Ohio river, but nine-tenths of the necessities of life were obtained from the forest direct and agriculture was but a secondary consideration. Why should the settler, even though he be an inherent husbandman, clear the ground and grow extensive crops? After his own simple wants were supplied, what could he possibly do with the surplus? But an unbroken forest extended in every direction. The river offered the only outlet and the nearest market was New Orleans. Little wonder, then, that agriculture made slow progress in those early days.

Agriculture as an industry in Ohio cannot be said to have started prior to 1832. At that date the Ohio canal was completed and the facility for transportation thus afforded commenced the era of agricultural improvement in this state.

The accessibility to market induced every land-owner to pay greater attention to the cultivation of the soil.

Agricultural development was given another forward impetus by the introduction and extension of railway systems, which became important in 1850 and have finally superseded the earlier form of transportation.

Then, as now, the influence of good roads upon agricultural prosperity was

partially realized and the National government undertook the construction of one good road, the National Road, from Cumberland City, Maryland, to Zanesville, Ohio. This excellent highway, when completed, about 1830, offered direct communication with the eastern markets and proved a tremendous stimulus to agricultural development. Numerous shorter turnpikes were soon added to Ohio's good roads equipment. Much more attention was henceforth given to the growing of live stock, since the animals could readily be driven through to market.

Ohio cattle interests early had the benefits of importations of pure bred stock from England. It is probable that some of the first stock brought into Ohio was descended from the Short Horns imported from England into Virginia and Kentucky by Mr. Patton, first in 1783 and later in 1817. However, during the first quarter century of Ohio's existence, by far the greater number of native cattle were scrub stock.

* "The first importations into Ohio from England direct was made in 1834, under the auspices of the Ohio Breeding and Importing Company. On Nov. 2, 1833, Governor Trimble, George Renick, General Duncan McArthur, and others, for the purpose of promoting the interests of agriculture and of introducing an improved breed of cattle, formed a company and contributed the amount necessary to import from England some of the best improved cattle of that country. The sum of \$9,200 was very soon subscribed in ninety-two shares of \$100 each, and after making the neces-

* From Burkett's History of Ohio Agriculture.

sary preliminary inquiries and arrangements, the company appointed Mr. Felix Renick, of Ross Co., Ohio, their agent for the purchase and importation. Nineteen bulls and cows of the pure bred Shorthorn and Durham stock were purchased from some of the most celebrated and successful breeders of England. These were brought to Ohio, and kept together, under the care of an agent, and they were increased in number by additional importations from England until 1836, when the whole was sold. After paying all expenses a dividend of \$280 per share was declared on the ninety-two shares of the stock company, amounting to \$25,760."

Devons were imported in 1842, Ayrshires in 1845, Herfords in 1852-53, and Aberdeen-Angus in 1875. The first pure bred Jerseys were brought direct from the Isle of Jersey in 1865 by A. D. Bullock, of Cincinnati.

Dairymen soon became dissatisfied with their native milk and butter producers and since 1875 importation of Jerseys, Guernseys and Holsteins have been large and almost continuous, very high prices being paid for particularly fine animals.

Ohio early took a leading place among the sheep producing states and has successfully maintained the position even to the present day. To Seth Adams belongs the distinction of having imported into this state the first sheep for breeding purposes. In 1801 he brought from France a pair of Spanish Merinos and placed them in his flock at Zanesville. The first pair of offspring sold by Mr. Adams went to Judge Todd, of Kentucky, and brought \$1500. This importation by Mr. Adams has had a marked influence upon the flocks of Ohio and Kentucky and is perhaps second in importance only to the importation of nearly one hundred

head brought to Connecticut by Colonel Humphreys upon the completion of his term of office as minister to Spain. In his official capacity Mr. Humphreys was enabled to select some of the very best stock in Spain. Many of these animals later found their way to Stark County, Ohio, through the agency of Mr. Rotch, a prominent breeder of the period.

Under Ohio conditions and management the Spanish Merino has undergone considerable modification in form and general character and from this stock has been developed the American Merino.

The Southdowns, Lincolnshires, Cotswold and New Leicesters were introduced about 1834. The Shropshires and Dorsets were brought in at a later date, but have made rapid progress.

Ohio has always been a swine producing state, and within her borders two of the most popular and celebrated breeds owe their development. Little advance was made in the improvement of swine prior to 1850, but the development since that time has outstripped that of any other branch of live stock.

The Miami Valley seemed to be the center of this industry and Cincinnati soon earned the appellation, "Porkopolis."

By a mixture of bloods, including the Berkshires and Bedfords, Irish Grazers, Russians, and the Chinas, and, influenced by local conditions, there finally evolved the Poland Chinas, admirably adapted to the locality and markets. In Northern Ohio, in the dairy districts the white hog of Pennsylvania was improved and became known as Todd's Chester White.

Farm Crops and Fruits.

Wheat has always been extensively raised in this state, and as early as 1825 was the staple crop. One of the first varieties grown was the Red Chaff

Beared. It was an excellent yielder and well suited to the locality, but about 1838 it became so readily susceptible to the rust that it was abandoned. Velvet Chaff, White Flint, and Michigan each had its period of popularity, but successively fell prey to the rust and was abandoned. About 1846 the Mediterranean variety was introduced and has withstood the rust well. Other varieties have come in their turn, to succeed or fail, and to-day we have a score or more of well-known varieties.

Flax and hemp at one time occupied considerable acreage in Ohio, but have been almost entirely driven from the fields by the competition of cheaper cotton fibres.

As early as 1790 apple orchards were started on the hillsides at Marietta. In 1805 the peach and pear became well established also, and this region was long noted for its luscious fruits.

The inroads of insects and fungus diseases became more noticeable as settlements increased and, since no remedies were then known, most of the orchards were abandoned by 1860 or 1870. Of late years, however, orcharding has obtained a new start in that section and now bids fair to regain its lost glory and prominence.

In the development of small fruits the name of Nicholas Longworth, of Cincinnati, stands out pre-eminently.

Through his development of the Catawba grape, first Cincinnati and many years later the lake region, have been given an industry involving investment totaling many millions of dollars.

Probably no state has contributed more to the invention and development of farm machinery than has Ohio. The first self-polishing, steel mouldboard plow was made in 1845 by Mr. E. A. Strong at Gambier, Knox County. In the same year as McCormick's original invention, Obel Hassey, of Carthage, Hamilton County, also invented a reaper, both these machines being patented in 1834.

While Ohio was not the home of the inventions of several of our most important machines, she was usually the great experiment field where the tools were tried out and developed. Springfield was for many years the home of the largest manufacturing plant of agricultural implements in the world, and, even since the destruction of the great Whitley plant, Springfield still manufactures probably more farm machinery in proportion to its size than any other American city.

Progress along all these lines, as well as many others not mentioned, aided and guided by developing educational facilities, has placed and maintained Ohio in the first rank of the leading agricultural states.



THE OLD AND THE NEW.

The First Agricultural College Publication in the U. S.

RALPH W. JORDAN, '14

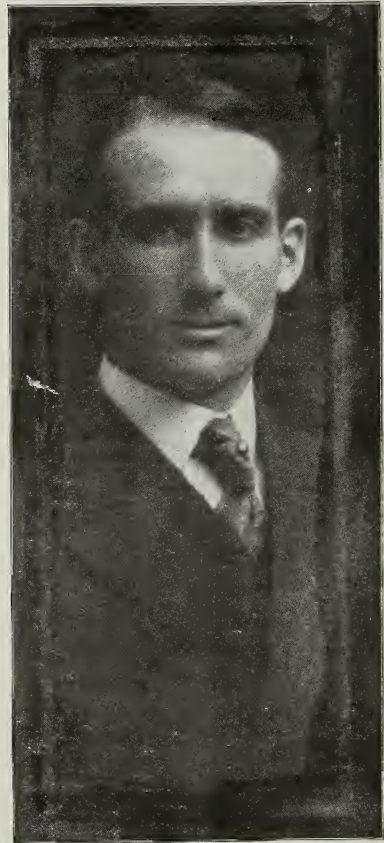
SEPTEMBER 1, 1894, gave birth to The Agricultural Student, the first agricultural college paper ever published. The outcome of the launching was doubtful. The whole enterprise was an experiment. Its success remained to be proven. Sometime dur-

jornalists could make a go of it and the undertaking would be serviceable and cover a useful field.

Perhaps the financial risk in embarking upon so new an enterprise involving the expense necessary to publish the periodical would brand it as a wild-cat



CHAS. W. BURKETT.



JOHN F. CUNNINGHAM.

ing the month preceding, the faculty of the School of Agriculture had been approached for permission to publish the paper. One professor greeted the proposition with a humorous smile. Another felt confident that the embryonic

proposition in the eyes of a business man. Perhaps the editorial judgment of agricultural students would be viewed with skepticism by faculty and reading public. Dean Hunt did say go ahead, but a few days later there ar-

rived the following typewritten statement which of necessity ran for many years in the editorial heading: "While this paper is published with the consent and approval of the President of the University, and the officers of the School of Agriculture, the editors of this paper are alone responsible for the statements in all unsigned articles."

Nothing daunted the efforts of the amateurs behind the rudimentary student paper. In due time the first edition was off the press. An editorial in *The Lantern* at that time ran as follows: "The success of the venture remains to be seen, but we prophesy a long and successful career to our worthy contemporary and wish it many returns of its birthday."

Turning now from these things, let us see what forces were at work behind the apparently frail adventure. What was the real cause of its coming into existence? An editorial in the first issue touched the surface; the object being "to bring the University and especially the School of Agriculture into closer and more friendly relations with the people, especially the farmers of the state."

Years ago the study of agriculture held little interest among people in general from an educational standpoint. Although the "School of Agriculture" was an adjunct to the University, its students had no common bonds of fellowship with those of other departments. The "Ag" was held apart from those of other courses of study, a victim of unfortunate circumstances. He was stamped as an "Ag," for neither vice nor virtue could make him different. Few, if any, were known among the general student body. They did not mingle to any extent. Nor was the "Ag" ever lauded, as distinction and honor were never his.

In the spring of 1894 Charles W. Burkett, a junior in the School of Agriculture, was elected as one of the *Lantern* Editors by the Horton Literary Society. The election waxed warm but Burkett won, and the first agricultural student had been elected to the *Lantern* Staff. Mr. Burkett is Editor of the *American Agriculturist* now and has won a good many battles since that time, but great credit is due him for being among the first to impress himself upon the general student body.

During the summer that followed there grew out of his efforts an idea to create a new order of things. "Publish a paper in the interests of agricultural education." Give the agricultural student a chance to show others that he is alive and real and just as human as any one else. Inspire self-confidence in him. Let him demonstrate that he has the same love for the higher arts as his fellow students.

Mr. Burkett was then spending his summer vacation at the University. Sometime during August he talked with a few members of the faculty as before mentioned. Not much elated as a result of the interviews, yet not disposed to back out, he sought the advice and counsel of Professor F. P. Stump. Prof. Stump, a graduate of 1892, was then in charge of the college farm. Being a comparatively recent graduate, he could very well comprehend the possibilities of the proposition and yet give sage and sound advice to its investigator. He became interested at once. He gave not only his advice, but offered his services and support as well. Prof. Stump had business connections and acquaintances in the city and it occurred to Mr. Burkett that he would be a valuable man to be directly associated in the work. Consequently he was placed on the staff as

Business Manager. It was through the persuasive powers of Prof. Stump that business men were coaxed into investing in advertising that first year. In fact, had it not been for the success of Prof. Stump in soliciting advertisements, the primitive periodical, a publications like which there was no other at that time, would have become bankrupt in its infancy. Very few subscriptions came in and the publishers were entirely dependent upon the advertisers, principally Columbus merchants. But the printer was compassionate, and by the end of the year every obligation was met with a small margin carried over.

On the editorial staff the first year were: Messrs. J. S. Hine, now professor; M. M. Rarick, physician; R. W. Dunlap, ex-senator and farmer; D. A. Crowner, butter manufacturer; John F. Cunningham, Editor *The Ohio Farmer*; Frank Ruhlen, farmer; E. J. Riggs, H. H. Loomis, and G. E. Spiers. Two of these were graduates, two were seniors, five were juniors and one sophomore. John F. Cunningham, the sophomore, was later elected Business Manager. He was the first student shouldering

the responsibility of this office, the one in whom was entrusted the possibilities of publishing the paper. A strenuous position, too, at times, for the job of keeping the ship afloat required persistent fighting to get results.

The growth of the paper that represented the true spirit of the College of Agriculture has been as sure and certain as the growth of agricultural education itself. Every year shows improvement and each issue creates new interest among those concerned in the study of agriculture. The paper has grown from a twelve page edition to one that is eight times that size. Other agricultural college publications have since sprung up all over the country. Once with very few subscribers, it is now the pride of both student and professor and is read by the learned and layman as well.

Editor Burkett said in speaking of his connection with *The Agricultural Student*: "I can say that the experience I had has been invaluable to me and I doubt if anybody in all the land actually enjoyed a journalistic experience more than I did the time I was connected with this embryonic farm paper."



ROOTING FOR "OHIO STATE."

An Ideal Country Home

THE insistent tinkle of a bell called me to the telephone in my room at a certain Green County hotel which I chanced to be visiting for a short period.

I immediately recognized the voice of an old college chum who lived on a farm near a neighboring town. "Would I come out and visit him if he should drive over after me?" "Well, I should guess, yes!" That

I was well aware that the cool moonlight summer's night was most beautiful, that the country through which we passed was a prosperous and most excellent agricultural region, and that the large, stone-flanked, gateway, and arched drive which we finally entered, portended much for the morrow. How much I did not know until upon being awakened by the streaming sunlight and the caroling birds the next morn,

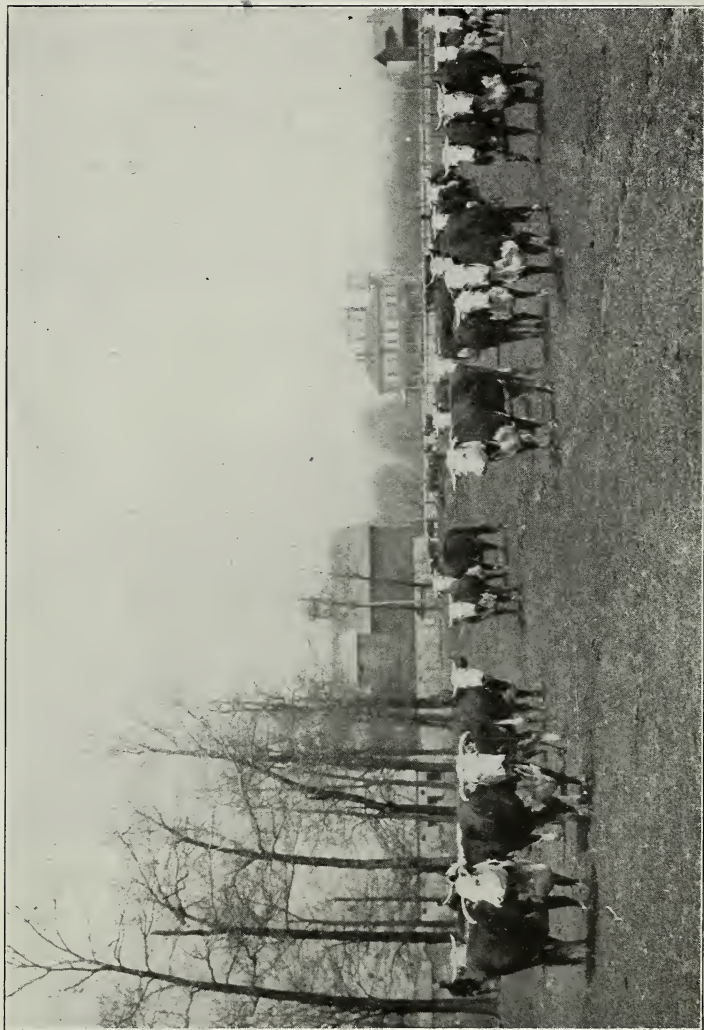


A BOWER OF ROSES AND TREES AND VINES ENSCONCED MY ABIDING PLACE.

settled it. Accompanied by two friends he arrived about four o'clock—just after I had finished my lecture for the day. We immediately drove to a nearby park where we speedily eliminated every vestige of the excellent picnic supper prepared by the "two friends." After participating in the various diversions of the park for a time, we started for my friend's home, rapidly conveyed behind a pair of lively bays.

I looked about me and saw what a veritable bower of roses and trees and vines ensconced my abiding place; until I had experienced the cool and refreshing delight of the various furnishings of delight of the various furnishings of ease and comfort with which the deep, wide veranda was generously supplied; and finally until I had met the charming parent and brothers of my friend.

None lacked appetite for the breakfast which followed, at least I can give



So much alike, 'twere difficult to tell
Which cow were which, unless you knew them well.



Undisturbed and unmolested in the mead,
With naught to harm, the sheep contented feed.

expert testimony in one instance. Just preceding family worship our animated conversation was interrupted by a telephone call from a neighbors, completing arrangements for an automobile trip to Joseph Wing's farm twenty-five miles distant, which our host and hostess had planned for the day. The machine was presently at the door and since it would be necessary for me to leave before their return, it was with much regret that I bade them good-bye after such a brief acquaintance.

Their departure effected, our time was now free for amusement—or almost free. Of course there was ice cream to freeze and water to pump for the bath room, the kitchen, and the stock, but the gasoline engine rendered this mere play and before long we started out to inspect the farm.

After being shown two large cement block silos in process of construction, after having viewed with admiration several Percherons and colts, a large flock of Merinos and Dorsets and several droves of excellent Duroc-Jerseys, after tramping over acres and acres of blue grass and clover pastures and noting large fields of corn and alfalfa, I found myself persistently thinking, "Well, how big is this place, anyhow?" Inquiry brought forth the fact that the farm now consisted of three hundred acres, practically all tillable. The equipment included two tenant houses and two sets of barns. The tenants are allowed a garden space, pasturage for a cow and a pig, and are paid a stated sum per working day with a special rate for harvest and corn cutting. Under this arrangement they are perfectly contented, put the owner's wife to no inconvenience and rarely care to move from the farm.

It was a source of great satisfaction

to me to learn that the owner of this magnificent farm, a man now in vigorous middle life, had earned by his own efforts practically the entire investment represented. Previous to 1903 the farm consisted of about 100 acres. A system of purchasing feeders has been followed, particularly the use of winter feeder lambs. In this way an extra profit has been derived and at the same time the fertility of the farm has been increased until at the present time it is at the very height of condition.

Upon returning to the main residence I asked for a few minutes in which to arrange my notes for the afternoon's lecture and was shown into a room which I immediately recognized as symbolizin, in a way, the vital factor of success—the real heart of this whole farming enterprise. It was the office—the outward sign of the logical, orderly, mind which conducted the multitudinous operations of the farm on a business basis and in a business like manner. To me it bespoke the real difference between the "cut, try and guess" method, and the "know-how" method.

I was seated at the roll-top desk, neatly printed stationery was handed me, a typewriter whirled around at my side and I was left to my own thoughts.

My notes rapidly assumed shape, dinner was announced, and after partaking of the hearty repast which the girls had prepared for our special delectation, I was taken to the nearby town where I caught the interurban car which whisked me to my destination in time for the afternoon lecture. But my thoughts were not of the lecture—I was thinking of what certain misguided city friends had said about "living in the country" and was wondering how on earth anyone could live

by preference penned up between four brick walls on a two by four lot in the city, when such a wealth and plentitude

of wholesome living such as I had just experienced, might be theirs.—Editor.

Development of the Ohio State Fair

GEO. B. CRONE, '13

TO most people the term 'fair' brings to mind a display of products of the farm. And so it is, but with much more added. If one considers the fair in this way he must inevitably associate its history with that of the history of agriculture in Ohio.

The first settlers in Ohio were of necessity agriculturists. Their houses were built of logs and covered with

May. The planter carried his seed corn in a bag, which was suspended about his waist. When the corn came up, a hoe was used for cleaning out the weeds and stirring the soil about the plants. This is but a glimpse of the condition of Ohio agriculture before the first fair held in 1850. It will bring before us what we might have seen at that fair had we been there.



HORSE BUILDING.

long, split, oak shingles, held in place by logs or poles used as nails. School houses and churches were also built of logs. Oxen were generally used for farm work; they were less expensive than horses and more easily kept, with the additional advantage of being available for beef when unfit for work. Wheat was sown broadcast among stumps. Red Chaff bearded wheat was introduced by early settlers and was one of the first varieties cultivated in the state. Corn was planted early in

It was held at Camp Washington, near Cincinnati. It was a great success and the attendance was large. This and those held later could be compared with our best county fairs of today. Buildings were arranged only temporarily. Each day multitudes of conveyances carrying people to the fair made up part of the attractions. Exhibits of home farm-products were shown almost exclusively. Mother's ability to prepare prize preserves then meant more than it does now. Few implements

were shown as few improvements had been made. In all, it was a happy reunion of those people nearest the place where it was held.

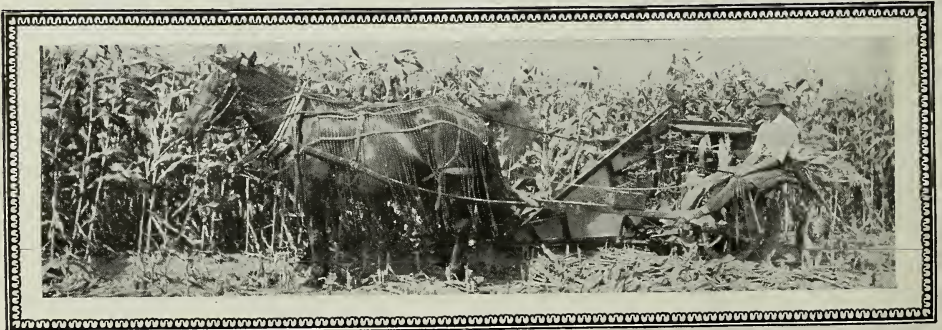
Following this, the fair was without a permanent home for some years. It was held in Columbus in 1851; Cleveland, 1852; Dayton, 1853; Newark, 1854; Columbus, 1855; Cleveland, 1856; Cincinnati, 1857; Sandusky, 1858; Zanesville, 1859; Dayton, 1860, 1861; Cleveland, 1862, 1863; Columbus, 1864, 1865; Dayton, 1866, 1867; Toledo, 1868, 1869; Springfield, 1870, 1871; Mansfield, 1872, 1873. In 1874 the State Fair was located in Columbus, occupying the grounds of the Franklin County Agricultural Society (now Franklin Park) until 1886, when it was permanently located on the Ohio State Fair Grounds, comprising one hundred and fifteen acres, situated just north of the city. These grounds have been improved and beautified and fine buildings erected for the accommodation of exhibitors in every department. At present, there are seventeen buildings in all, the live stock building being among the largest and most commodious in the United States. This year a

new dairy building has been added which insures an extensive dairy exhibit.

With a fair every year since 1850, except in 1888, when the "Ohio Centennial Commission" was authorized to hold its exhibition on the State Fair Grounds, the present magnitude has come by a gradual evolution of our agriculture, and it is now and must of necessity remain in keeping with the general progressiveness of our farmers.

How much good the State Fair in common with our county fairs have done in contributing to the vigorous growth of the state and our material prosperity, can never be estimated.

But the influence of the agricultural fair idea has been quietly and silently made, and today we are bequeathed a rich legacy in the form of awakened thought of a better husbandry. The impulse given us by the fair has resulted in better and more thorough cultivation of the soil, superior grades of all agricultural and horticultural products, the introduction of improved machinery, and the application of scientific principles in all the operations of the farm and garden.



AGRICULTURAL FAIRS FOSTER MODERN METHODS.

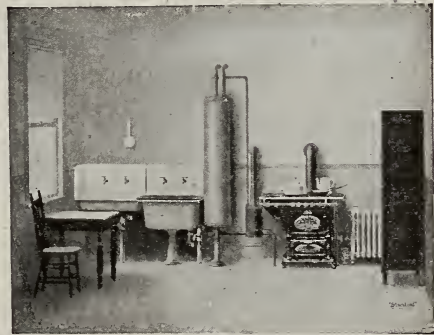
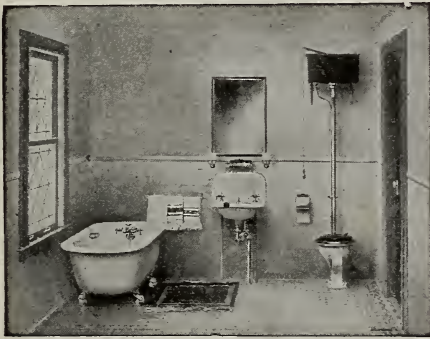
Water Supply System in the Farm Home

S. E. BROWN

NE of the causes of dissatisfaction with farm life as found by the commission appointed by Mr. Roosevelt when president, was the lack of conveniences in the home. It must be admitted that when compared with the conveniences found in the average city dwelling, the farm home even of the well-to-do farmer shows badly. Labor saving devices have been purchased for farm use to a very great extent. The money invested for conveniences for the home, however, is comparatively

the advantages and sanitary conveniences of the city home. A modern bathroom, kitchen, sink, hot water tank, running water in the laundry, dairy and barn are comforts and conveniences of far greater value to the farmer than the small cost they represent.

One great virtue of a pressure water system is that it makes a modern bathroom possible. From a hygienic standpoint the bathroom is an absolute necessity. The conditions under which the average family on the farm lived until



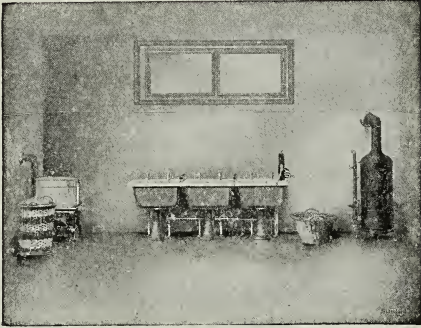
NOT LUXURIES, BUT NECESSITIES.

small. Fortunately this state of affairs is changing and while a few years ago one would possibly have found a sewing machine, washing machine, bread mixer and perhaps a few other articles whose use lightened the labors of the house wife, it is now not uncommon to find in addition to the above mentioned articles, water systems, heating systems, lighting plants, refrigerators, vacuum cleaners, fireless cookers, etc.

There can scarcely be any dissention to the statement that of all the above mentioned items, the water system stands first in its importance to family comfort and welfare. The farmhouse with a pressure water system has all

recently would not be tolerated by a city family. Of course one can have baths regardless of whether there is a water pressure system or not. But the plain fact is that bathing is neglected when it means the carrying of water from well or cistern, heating it on the stove and securing after all this effort a rather unsatisfactory bath. When a man comes in from the field after a hard day's toil, his body reeking with perspiration, dusty, tired, exhausted, nothing is more refreshing and conducive to a good night's rest than a pleasant, agreeable bath. It will be taken, too, when the only effort required is to turn on the water.

When the element of convenience is considered it is surprising that the farmer has so long permitted himself—and especially the women of his household—to worry along with the endless toil of water pumping and carrying. It is the wife and daughters that usual-



IT LIGHTENS LABOR.

ly suffer most. Not only must water be carried for ordinary domestic purposes but on wash days when the work should be lightened it is increased by the labor necessary to carry tubful after tubful from cistern or well, frequently in inclement weather when the risks from exposure are great. Contrast this with running water both hot and cold always on tap! The sum that would be invested in a new implement to lessen the work on the farm should surely not be considered exorbitant to expend for equipment that will put an end to all this needless drudgery.

Water systems as now offered for private installation give ample opportunity for one to secure apparatus that is dependable and that can be secured for a reasonable outlay. One of the most popular types marketed is known as the Fresh Water System, so called because with it water is delivered "Fresh" from the well to the faucet. This system will always have preference where convenience and flexibility

are given first consideration. It is, in fact, the most modern method of water delivery under pressure and gives service fully equal to and in most cases surpassing that available in the city. For instance it is not at all infrequent to find these systems supplying water from well or spring for drinking purposes; from a cistern for domestic use; and from one or more additional wells for stock and general purpose use, and all operated by only one power plant. This Fresh Water system is available when the water does not have to be elevated more than 100 feet and where the water is clean, free from sand, grit and other impurities.

These plants consist of an air compressor which may be driven by a small gasoline engine or electric motor, an air-tight steel tank for air storage and an auto-pneumatic pump for each



USING NATURE'S POWER.

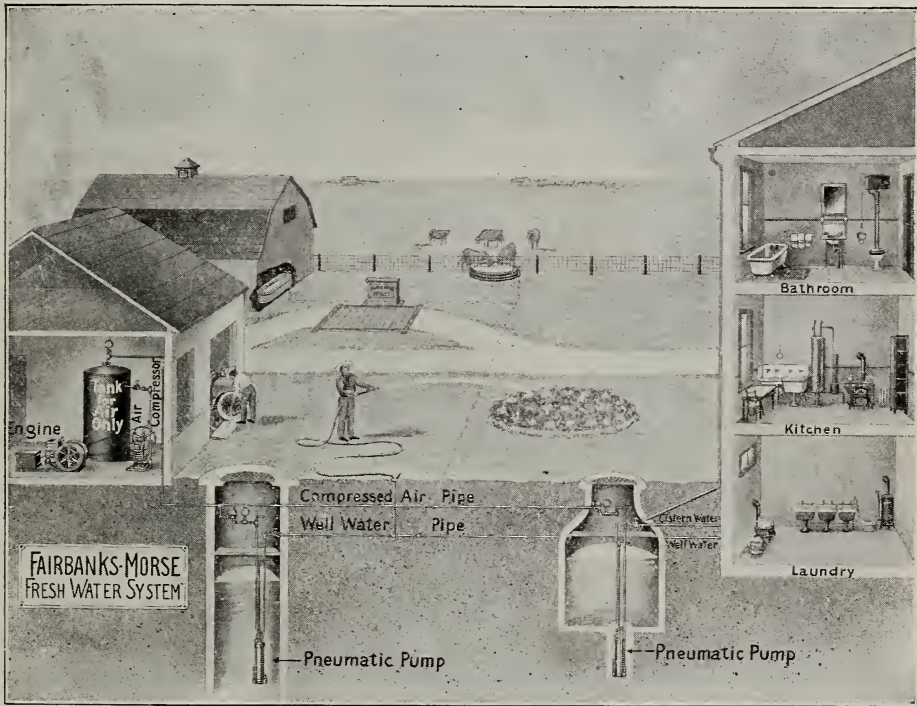
source of water supply. These pumps consist of two small metallic chambers which are submerged in the water. When a faucet is opened they automatically fill and discharge due to the compressed air pressure from the storage

tank, thus giving a continuous flow of water. In addition to the strong feature of water being delivered fresh and cool an advantage of this system is that since compressed air can be piped most any distance to the auto-pneumatic pump in the well without any appreciable loss, the power plant, and air storage tank can be located wherever con-

sion of compressed air from a 1,000 gallon air tank.

TOTAL PRESSURE IN TANK AT START—
IN POUNDS.

Pressure on Pump.	40	60	80	100
25 lbs.	375	833	1310	1786
35 lbs.	102	510	924	1327
45 lbs. ....	...	255	596	936
55 lbs. ....	...	68	330	612
65 lbs. ....	...	...	153	357



A COMPLETE INSTALLATION.

venient, as in barn, garage or dry basement. This makes it an easy matter where an engine is used, to arrange to have it drive other machinery when not in use for pumping water.

For the benefit of our readers who may be interested to know something of the engineering problem in connection with water systems we give below a table showing the amount of water, in gallons, that can be drawn from faucets by auto-pneumatic pumps at various working pressures by the expan-

To make the above table of greater value an estimate of the amount of water used for various purposes on the farm is also given.

Horses drink 5 to 10 gallons per day. Cattle drink 7 to 12 gallons per day. Hogs drink 2 to 2½ gallons per day. Sheep drink 1 to 2 gallons per day. With 40 to 50 pounds pressure per square inch, an ordinary ¾ inch garden hose nozzle requires about 6 gallons per minute, when throwing a solid stream, or about 4 gallons when spray-

ing. It requires about 8 gallons to sprinkle 100 square feet of lawn; 16 to 20 gallons will soak it thoroughly. Thirty gallons fill the average bath tub. Three hundred gallons is a fair estimate of the amount of water required by the average sized family in 24 hours.

Only power driven outfits should be considered where any considerable amount of water is to be used. In this connection it may be stated that the amount of water used for general purposes will be greatly increased when the water supply system is put in service. This does not imply that a family will be extravagant in the use of water merely because it is easily obtained. It means that all too small an amount is used where the family depends on other methods. In addition to the plentiful use of water for domestic use and for proper stock watering it is obvious that much will, if available, be used for other needs. Thus the garden will not be allowed to perish in case of drought nor will lawns and flower beds be permitted to die down in the summer.

Where one desires to draw water from a single well, or from a well or cistern the pneumatic tank method is frequently used. In this case water is pumped into an air-tight tank the compressive force on the air serving to force the water to the taps.

Regardless of the system selected a hand operated outfit should not be con-

sidered unless the water to be used is confined to purely domestic purposes. A considerable amount of physical energy is required to get a supply of water stored under a pressure of from 60 to 70 lbs. As fire protection is one of the great features in favor of water pressure systems it will readily be seen that low pressure outfits are not advisable. Where water from cistern for bathroom, sink, etc., is all that is to be pumped a hand outfit may be found satisfactory. It is not at all fitted for service where stock watering, lawn sprinkling, carriage washing and similar purposes are to be served.

The plan of a new house should invariably incorporate a water system even though the installation of the system is not to be made immediately. In the same way in the selection of a kitchen range or furnace it should be seen to that the firebox has pipes for water heating or at least so arranged that these may easily be put in place. Heating from the range is in a measure more satisfactory than from a furnace as the range is more likely to be used the year round. Plans for the barn should also be made with a view to having water brought into the building, as inclement weather makes caring for stock a hardship. This is especially true during the severe weather of winter. With a water pressure system it becomes an easy matter to fit up a tank in all buildings where animals are kept so that stock can be watered without exposure.

The Ohio Rural Life Survey

H. E. ESWINE

Extension Department, Ohio State University

THIS year Ohio is the scene of one of the most complete inquiries that has ever been made into the conditions of rural life. This inquiry is being conducted by the Ohio Rural Life Survey under the direction of Dr. Warren H. Wilson, Department of Church and Rural Life, of the Presbyterian Board of Home Missions. Dr. Thompson, President of the Ohio State University, is the

effort been made to carry on such an inquiry on as large a scale as in Ohio. Here the intention is to cover in all about twenty-five counties. These counties are typical of the different sections of the state. For instance, Columbiana and Harrison were chosen to represent Eastern Ohio; Adams and Lawrence, the hill section of Southern Ohio; Fayette, a county having a large per cent



CENTRALIZATION—ONE SOLUTION OF RURAL SCHOOL PROBLEM.

head of the Advisory Council which is composed of representatives of nearly all of the religious denominations of the state, together with representatives of the College of Agriculture, of the Ohio Experiment Station, and of several Ohio Colleges.

Ohio is not the first state in which surveys of this kind have been made, as published reports of such work in Illinois, Indiana, Missouri, Kentucky, Pennsylvania, and Maryland are now out. However, in no other state has an

of tenant farmers, and Miami, one of the best agricultural counties. In each of these the rural life problem has a little different aspect.

The object of the survey is to take as accurate account as possible of the social, economic, religious, and educational machinery of a community. The main feature is the religious phase and the other subjects of inquiry are studied and investigated with reference to their bearing on this one. The relation between all four is so close and vital

that a good understanding of one can not be obtained without a knowledge of the others. Successful farming, live churches, efficient schools, and good homes go hand in hand.

The survey is being made by counties, four or more men being assigned to each. The township, though, is taken as the community unit, and one man gives his entire time to that for from two to ten days, depending upon the size of the township, and the thoroughness with which he wishes to cover the ground. After all the townships have been gone over, the results are tabulated and a meeting is held at some central point, generally the county seat, to which the ministers and other interested parties are invited. In these conferences the most striking things in the survey are pointed out. Articles are run in local papers calling the attention of the public to some of the important results obtained.

Of course, the admission must be made that absolutely accurate information can not be obtained, but enough can be gathered to enable us to tell with a reasonable degree of certainty what the trend of things is, and this is possibly as much as we can hope for or ask.

On the economic side an effort is made to find out the income of the farmers. Manifestly, the larger the income of the farmers of a community, the better able they are to support religious and charitable organizations in their midst. Note is made of the methods of farming that are followed, also the systems of crop rotation, the farm labor problem, and the number and character of the population. In connection with this, methods of communication and transportation are considered.

On the social side of the inquiry the

number and membership of secret and fraternal organizations is taken. The means of recreation and social enjoyment are observed, the moral conditions and tone of the community so far as they can be found out are noted. This information is supplemented by the public records at the county seat, and in the offices of township and municipal officials.

On the side of rural education, the material equipment in the way of school-houses, grounds, apparatus, library and recreation are inquired into. The sex, wages, and qualifications of the teaching force are found out. The enumeration and attendance of pupils is ascertained. The extent to which the school serves as a social center is taken into account.

The inquiry into religious conditions comes in for the largest share of attention. The location and condition of the church building, the extent and appearance of the ground surrounding it, and other buildings thereon, and the size and location of the parsonage, if one is provided, are noted. The membership of the church is studied in detail. The number of members, their age and sex, are found out. The various organizations of the congregation, their membership and attendance are obtained. The organization and membership of the Sunday school and the classification as to age, etc., are considered. Special inquiry is made with reference to teachers in the Sunday school, both as to sex and to age. The part that the church, together with the Sunday school, plays in the social life of the community, is gone into.

Along with this inquiry, and as a part of it, an effort is being made to have an intensive study made of as many communities as possible. The plan is to enlist local ministers and other interested

parties in making a house-to-house canvass of an entire township, or even of a county, and in this way getting a complete and reliable church census. This is a step that logically follows the survey as it is now being conducted.

Some of the results that will be obtained in this survey are the following:

We will have an accurate record of the number of churches in a county or smaller unit; we will know just what denominations are represented; we will find out how many churches have been abandoned, how many are standing still and how many are growing.

We will know approximately the number of church members, the per

cent of these that attend church, and how they are divided as to sex and age.

We will have fairly accurate and reliable information on rural recreation and morals.

We will know what communities are over-churched and what ones are under-churched.

We will know more about the tenant problem in its relation to the church.

We will find out where the church is directing the social as well as the religious life of the community.

Finally, we will learn much of the inter-relation that exists between the social, religious, economic and educational forces of a community.



UP-TO-DATE FARMING IN CANADA.

Grape Culture in Ohio

B. A. SCHUELL

THE grape, although introduced into Ohio in comparatively recent years, has been cultivated from remote antiquity and is a native of the region surrounding the Caspian Sea, extending as far west as Crimea. It is safe to say that the grape was one of the first, if not the first fruit cultivated by man. From its native home it has spread all over the world and today may be found in almost every country, grown under various conditions with excellent results everywhere. The following poem from Munson's book on grape culture will serve to show when and how the grape has reached its present stage in development and usefulness.

The seeds were scattered around the
huts of mud;
Some grew and clambered up the walls
and bloomed all sweet,
At length bore fruit, and cooled the
huts with shade;
Some few bore better grapes than from
the wilds he brought;
Such vines he loved and saved and
kindly trained, betimes.
He always gathered from the new and
better vines,
And planted vacant places with their
seeds, select;
He gave to kith and kin, who likewise
grew and gave.
Thus on and on, through old, ten thou-
sand years,
Have come adown to all mankind the
twining vines.

One of the greatest factors which caused such persistent efforts for so long a time may be the fact that the grape is one of the surest of fruit crops and does well on any soil that is under good cultivation and well drained. This statement does not mean

that all varieties are adapted to any soil under such conditions, but that some one or other variety will grow in almost every soil and in nearly every climate in the world. The resistance to cold, heat, wet, drouth, alkaline and acid soils, insects and fungi, varies greatly with different varieties. Many of the so called failures in Ohio have been due to the planting of the wrong variety and to improper cultivation.

No doubt, to many of our readers, the magnitude of the grape growing industry in Ohio is entirely unsuspected. In 1876 Mead said that there were many millions invested in grape culture in the United States. That was forty-five years ago, almost before Ohio began to grow grapes. Today we can say of our own state what Mead said of the United States.

The history of Ohio's grape culture and wine making may be said to have commenced about 1822-'30 when Nicholas Longworth and a few other citizens of Cincinnati, devoted their time to the planting of Catawba vineyards on the clayey hillside in the vicinity of that city. These vineyards embracing several thousand acres, were, for a few years, so successful as to encourage liberal investments of capital and skill in the business of wine making and in a short time, "Longworth's Sparkling Catawba" and "Golden Eagle" became widely known as popular beverages at fashionable dinners.

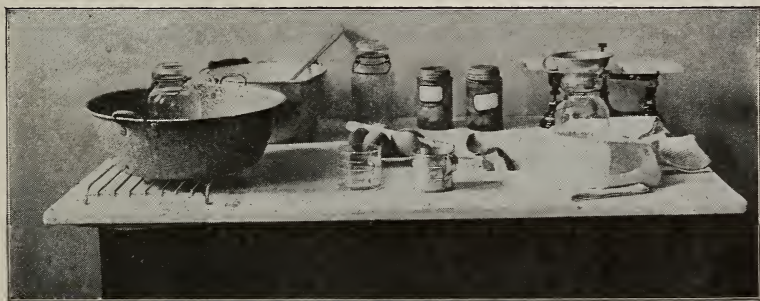
This success was but short lived, however, since black rot early made its appearance and caused such heavy losses that after repeated failures, the vineyards were abandoned. Soon after this Mr. Longworth died and his wine business was discontinued by his heirs,

although other parties have since carried it on in the city on a small scale. After all of these failures the Ives Seedling grape, which apparently was quite resistant to the attacks of mildew and rot and made a good quality of cheap wine, was largely planted in that locality, but in a few years it also succumbed to the fatal disease and was mostly abandoned.

At a much later date it was proven that the Catawba, in a general way, was exempt from mildew and rot in the Lake Shore region and the Islands. Here much planting was done about fifteen years ago. Not less than five

however, owe their success largely perhaps to the special adaptability of the soil to the varieties of grapes introduced. Then, too, about this time spraying began to be practiced. This has saved thousands of acres from being destroyed and made it possible to plant many hundreds more. The farms in this region range from 25 to 300 or more acres in size.

Taking all the causes of failure into consideration, I believe that not less than ten thousand acres of vineyards have been destroyed in Ohio during the past ten years. About seven thousand acres have been planted, leaving



CARING FOR THE PRODUCT.

thousand acres were set in three or four years. Wine making plants sprang up through the northern part of Ohio very rapidly and along the Lake Shore railroad one may see hundreds and hundreds of acres of grapes with the rows running usually northeast and southwest and at almost every town a "Welch's" sign indicate the principal industry of the place.

When the above mentioned, rapid planting was done, much was on badly chosen soil, with little preparation, so that nearly one-half of the five thousand acres never paid the cost of planting and was in time abandoned.

Kelley's Island may well boast of its many successful grape growers who,

about nine thousand acres under cultivation at the present time or only two or three thousand acres less than ten years ago. Since the disease and pests can be successfully combatted, the acreage has been, and will continue to be, gradually increasing. Several hundred acres of Catawba vines are annually planted on the islands to replace any that fail from age or other causes. Also some planting is done each year in the more favorable districts along the Lake Shore and in the interior.

In the latter place, there may be found many smaller vineyards of the Concord, Catawba, Norton and Ives varieties which have been quite successful. However, in late years the rot has

caused many of these vineyards to be abandoned.

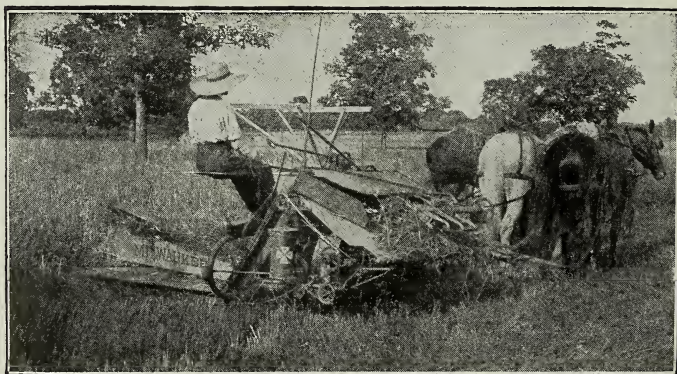
The rot has been one of the greatest scourges of the grape growing industry. It may now be controlled quite successfully if the vines are sprayed early in winter or before the buds push, with the well known spray, Bordeaux Mixture. The necessity for compulsory spraying arises largely from the negligence of the man who cultivates only a few vines for home use and really maintains nothing less than a substation where grape diseases and insects are propagated and passed on to those who are forced to spray, being dependent on the grape for practically their entire income.

The spraying laws which soon go into effect in Ohio should mark the dawning of a new era in grape culture. It will merely be a question of whether one wishes to spray and make grape growing a profitable business or whether he prefers to grow no grapes at all.

Taking a survey of the United States it is safe to say that there is scarcely a farm between the Great Lakes and the Gulf, that can not successfully grow grapes. Think what this means, fresh fruit from the first of June in the southwestern part of Texas to November in the Lake Shore region and extreme northern part of the United States. Besides the fresh fruit, we must remember also the wines and especially the unfermented grape juice which is so rapidly attaining popularity as a temperance drink. Surely with such a bright outlook before the grape industry, new and greater efforts will be put forth to make it one of the great, leading industries of the world.

NEWS NOTES ..C .. .

Two rows of fine young shade trees were destroyed along the main entrance at Fifteenth avenue to make way for the widening of the drive. The new road will be forty feet wide with cement walks ten feet in width on either side.



Why Gas Engines Go

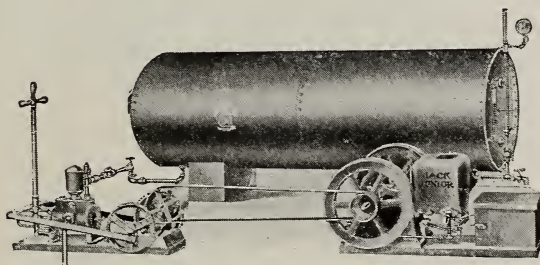
H. R. VAN DEVENTER

AMONG the 25,000 dealers and the 7,000,000 gas engine users in this country, how many really know what makes the engine "go."

The gas engine is the most simple power producing device imaginable. If properly understood, it is one of the easiest to keep in good working order. If abused by so-called "experts," who have not studied its principles of design and operation, a perfectly good engine which only requires a little cleaning out, or two or three turns of an adjusting screw, is often irretrievably ruined.

der. This fuel and the air are mixed in a device known as the "carburetor" which next to the "ignition" is responsible for most of the engine troubles.

The cylinder is now full of the gaseous vapor which is of course highly explosive. The momentum of the fly wheel now forces the piston back against this mixture, and the inlet valve being closed, the mixture is compressed. When compressed to the fullest extent, an electric spark is produced in the mixture which is exploded, thus driving the piston outwards



USING THE GAS ENGINE.

The main parts of the gas engine are the cylinder, piston, and fly wheel. The piston and cylinder form a sort of pump. The piston rod is usually connected by a crank to a pair of rather heavy fly wheels. When the engine is turned, the piston moves in and out of the cylinder just like the piston in an ordinary water pump.

Now there are two valves opening into the cylinder, one termed the "inlet" and the other the "exhaust." These are so geared that on the outward stroke of the piston (equivalent to the upward stroke of a well pump, the inlet is opened and a mixture of gasoline, oil, or some other suitable fuel with air, is drawn into the cylin-

der with great force. This force turns the crank and the fly wheel, the latter smoothing out the impulses and making the engine run steady.

When the piston is driven out by the explosion, the outlet or exhaust valve is opened at the bottom of the stroke, and when the piston moves up into the cylinder again, it drives out the burnt gases that remain in the cylinder. This causes the puffing sound of the exhaust. After the cylinder is thus cleared of the burnt gases a fresh charge is taken in as just described, and so on, as long as the engine runs.

The apparatus used for producing the spark which causes the explosion in the cylinder is often termed the "ignition"

and this causes by far the majority of gas engine troubles. Up to the last year or two nearly all engines had batteries for furnishing the spark, and as these become exhausted sooner or later, the spark often failed and the engine would not run. This defect led to the development of the built-in engine timed magneto, which is a device geared to the engine and forming part of same. This furnishes a plentiful supply of current as long as the engine runs and requires no attention or renewal. The best type of magneto has means for checking the timing by simply looking at same, no careful measurements or expert adjustments being necessary.

These magnetos should not be confused with small dynamos driven by a

belt or a friction wheel bearing against the face of the engine fly wheel, as such dynamos often cause trouble on account of the high speed at which they must be run. The built-in magneto is universally used on automobiles.

Those who are wise will carefully study the instructions sent with their engines. These instructions are simple and any one can understand them. Study why and how your engine "goes," so that in case of anything going wrong, you can locate the trouble as it is seldom necessary to tear the engine apart to make repairs. Those about to buy an engine should specify that it should have a "built-in" type of magneto having visible timing, a good carburetor, well made bearings, and a strong guarantee as to material and workmanship.



Death of Dr. Weber

HENRY BLACK

(From July University Monthly)

Henry Adam Weber, professor in agricultural chemistry, Ohio State University, and widely known as an expert chemist, died at his home in Columbus June 14, after a brief illness from apoplexy. He had not been well for some months and had not been actively engaged in teaching. He was 67 years old.

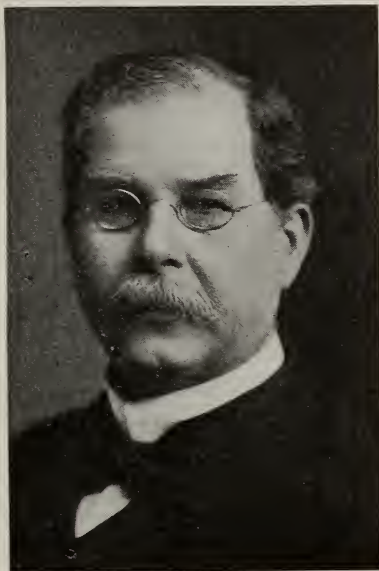
Professor Weber was born in Clinton township, July 12, 1845. He studied at Otter-

bein University. In 1863 he went to Germany to complete his education and studied at the University of Munich. He was one of the early pupils of the eminent German chemists, Justus von Liebig.

Returning to America, he was given the degree of doctor of philosophy by Ohio State University in 1879. He married Miss Rosa Ober of Landau Palatina, Germany, in 1870.

For several years Mr. Weber served as assistant chemist for the Ohio geological survey and then became professor of chemistry in the University of Illinois. He attracted wide attention by experiments in the manufacture of sugar from sorghum and held several patents.

In 1884 he returned to Ohio and became professor of agricultural chemistry at Ohio State University, which position he held until the time of his death, and in which he achieved much



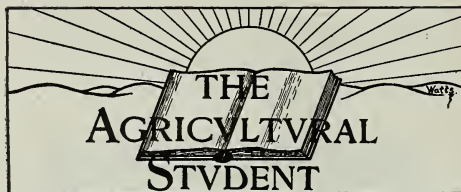
work of note in the field of agriculture and food chemistry. He held the position of chemist of the state dairy and food commission from 1884 to 1897.

He was a fellow in the American Association for the Advancement of Science, a member of the Chemical Society and the Ohio Academy of Science. He was the first president of the Columbus Chemical So-

ciety and continued in that office several years.

Professor Weber served four years on a committee appointed by Dr. Harvey W. Wiley for the standardization of pure foods, and was the author of a course in qualitative analysis that passed through four editions.

Memorial services over the ashes of Prof. Weber were held June 18 at the home, 1342 Forsythe Avenue. Rev. Allen Perry Bissell, rector of the Church of the Good Shepherd, read the prayers and President W. O. Thompson made a brief address in which he spoke of Prof. Weber's inestimable service to the cause of applied science and of his generosity of heart and integrity of purpose. As a citizen, teacher, scientist and man Prof. Weber won a large place for himself in the esteem of friends and associates. Many university people were present at the memorial services.



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COLUMBUS, OHIO, SEPTEMBER, 1912.

Editorial

Simultaneous with the approach of Autumn's cooling days, comes to ever increasing thousands the insistant Call to throughout the land Duty. From the sea shore, from the forest fastnesses, from the harvest field and from the cities' shops they begin to gather in. Starting first from isolated sources, flowing later into converging streams and finally uniting in great, surging, noisy, rushing, eddies about the relatively few large institutions of learning.

The exuberance of pure physical vigor and the hilarity of clean mental joy, here displayed are truly inspiring and need but the guiding hand of the instructor to mold them into mountains of health and oceans of knowledge.

Ohio State University and Ohio Agricultural College have again been

made a center of this eddying deluge—and it might be added that some departments have not as yet emerged. The Agricultural College in particular finds itself filled to overflowing. Something **must** be done to relieve the pressure and something **will** be done as soon as our legislators realize the situation.

But the question which concerns us now, and which should concern every returning student, is, "What are you going to do with this wonderful opportunity which the state has placed before you at enormous expense?" What does this new year mean to you? Does it mean just one more year of pleasure, and play, and petulance? Does it mean another year of cribbing and cramming and flunking? Or does it mean the golden opportunity, the main chance that you have been watching and waiting for? Well—here's hoping.

For eighteen years our title page has borne the caption, "Devoted to the Advancement of Agricultural Education,"—surely a worthy **OUR AIM.** object. Our first effort must be to keep our great body of alumni and students in touch with the advancement of agricultural science and agricultural practice in general, and the advancement of the Ohio College of Agriculture in particular. But we feel that we will not have accomplished our full worth nor have fulfilled our full duty to our institution nor to our constituency if we stop merely at this point. We believe that it lies within the province and the power of this magazine to contribute its mite toward the creating of the new "view point" toward agriculture as a **profession**, in the popular mind and particularly in the mind of the young man or young woman who has arrived at that stage of existence where either seeming necessity or desire impels him or her to leave the farm and seek a "career." To that end we are continuing the series of "Opportunities in Agriculture," we are dilating upon the beauties of farm life under **proper** conditions. We are emphasizing the need of, and in such degree as we are able, pointing out the means of improvement in home sanitation, rural school systems, produce marketing and distributing systems.

We are urging the necessity of organization and co-operation among agriculturists and a more careful development of the relatively new sciences of Rural Sociology and Rural Economics.

With this issue we are starting a department for secondary agriculture and are placing the magazine upon the reading tables of hundreds of high

schools. We are trying to communicate to those standing upon the threshold, as it were, that spark of vitalizing, invigorating, enthusiasm ever engendered within the bosoms of those long under the influence of the "scientific idea" as embodied in the "New Agriculture."

'Twas a happy thought that first evolved the idea of "Ohio State" day at the state agricultural fair.

OHIO STATE DAY. In the first place the get-together spirit is one which ought to be fostered, and in the second place no more fitting assembly place could have been selected than the fair grounds to which all alert and progressive agriculturists make a pilgrimage at least bi-annually. However, if the present plans are consummated this will speedily become more than a mere meeting-day for alumni and students. It will become nothing less than the time and place at which far-reaching plans for the advancement of the agricultural college are developed, discussed, and started into operation. These when transplanted to the various counties of the state will, in short order, make it evident to our legislators that the farming interests **demand** larger appropriations for educational facilities, better distribution systems for produce, better railroad freight and express rates, parcels post, and the like. And what the farming interests really **demand** they will undoubtedly secure.

It gives the management of this magazine much pleasure to be allowed to aid in the establishment of this day as a permanent institution and we urge all who possibly can, to arrange to be present next year.

This morning in the course of my early walk I arrived at a slight eminence just as "Old Sol's"

THE first faint rays began to
DAWNING shoot across and light up
ERA. the eastern horizon. At first I saw only the shimmering reflection upon the low-hanging clouds. Then distinct bands of light seemed to grow and radiate from a common center and constantly increased in intensity. Finally I saw the brilliant rim of the golden orb itself pushing its way across the horizon—just as you have seen it hundreds of times.

While standing thus contemplating this diurnal phenomenon the thought was borne in upon me that not only was I observing the dawning of a new day, but in a broader sense and agriculturally speaking the dawning of a new era.

Haven't we already seen the darkness of crude husbandry driven back by the first faint rays of scientific agriculture? Haven't you noticed these rays rapidly growing in intensity? The increasing attention and respect being given to agriculture are too self-evident to require comment. Aren't you momentarily expecting to see the full blazing glory of the sun itself—when agriculture will be universally recognized as a business in every sense; when the farm shall be considered a factory, and the raw materials and the product shall be handled by factory methods? Then must the nation's system of economics undergo a change. The past century has been one of mercantile and manufacturing development. The over-powerful storekeeper and hard-headed factory owner dictated terms to the needy, dependent farmer. With the increasing foreign and do-

mestic competition, with reduced tariffs and anti-trust regulations, the manufacturer and dealer must constantly work on a smaller margin. Then will land in reality be capital—and desirable capital at that—and fortunate will be the farmer who refuses the purchase money offered by the capitalist. With rising prices, occasioned by constantly increasing demands, together with greater production per acre, must not the farmer ultimately hold the key to the world's treasure box?

We most gratefully acknowledge our deep obligations to those individuals and organizations who have so generously supplied us with the articles and many of the illustrations which appear in this issue, and without whose co-operation this publication would be practically impossible.

Special mention is due the International Harvester Company of Chicago, the Johnston Harvester Company of Batavia, N. Y., the Extension Department of the University, The Ohio State Monthly, and the State Board of Agriculture.

Whatever degree of prosperity and growth "The Student" has experienced must, in the last analysis, be credited **OUR ADVERTISERS.** up to the patronage of our advertisers.

No concern will long advertise in a medium which cannot produce results. We represent a worthy clientele of advertisers. We likewise represent a large class of tentative purchasers. Won't you do your part to bring both classes together?

Come and see us. Make a special trip to the top floor of the Ohio Union building if necessary. Drop in at any time most convenient. There will usually be some one around the offices to welcome you, but either Monday evening or Saturday will surely find us hard at work. Come and offer suggestions and criticisms.

We enjoy variety and can receive brick-bats or bouquets with equal grace. If you desire some subject or some department more fully treated, let us hear about it. Remember, that we are always glad to receive contributions—either articles, clippings of prose and poetry, or photos. Let us cooperate to keep your magazine—The Agricultural Student—in the lead.

“The one time despised work of the farm-hand has become a lucrative vocation in Wisconsin, more lucrative apparently than the so-called learned professions. When the University of Wisconsin closed in 1911, the agricultural department had orders for graduates, which it could not supply, paying salaries aggregating \$450,000.

“While the graduates in law, medicine, engineering, etc., were competing for such limited opportunities as were offered, all the ‘Short Horns’ had been engaged before they completed their course, at salaries ranging from \$600 to \$3,000 a year.”



ALUMNI WHAT THE BUSY GRADS ARE DOING

W. H. Pew, who attended Ohio State Agricultural College from 1901 to 1904, has just been appointed as head of the animal husbandry department at Iowa State University at Ames. Mr. Pew succeeds Mr. Kennedy and will have charge of a department instructing nearly five hundred students.

After leaving Ohio State Mr. Pew went to Iowa State College and graduated. From there he went to New Hampshire State College of Agriculture, first as assistant professor of agriculture and later as professor of animal husbandry. At the end of his second year at New Hampshire he returned to Iowa to take a position in the animal husbandry department of that state's agricultural college, which position he has held until his present advancement.

C. R. George, '12, passed through the city several weeks ago on his way to California where he holds the position of assistant professor of animal husbandry in the College of Agriculture, under Professor Marshall, who has also forsaken Ohio for the "Sunset Land."

Perry Van Ewing, '11, secretary to the president of Kansas State College, attended the graduate school at Lansing, Michigan, this summer and stopped off a few days at Columbus before returning to Manhattan, Kansas. An article by Mr. Ewing concerning the agriculture of the "Sunflower State" will appear in an early number.

G. G. Hayes, '12, former business manager of this magazine, is on the

business staff of the Farm Press, of Chicago. He is particularly interested in the advertising end of the farm magazine business.

Eugene Ruth, '11, '12, is now employed as assistant chemist in the Iowa Experiment Station at Ames. He writes that the Ohio State colony now assembled at Iowa are contemplating some kind of Ohio State organization.

L. L. Heller, '12, is concerned with the management of a large creamery in Washington, D. C.

V. A. Place, '12, has secured the position of assistant professor of animal husbandry at the Illinois Agricultural College at Urbana.

C. S. Wheeler, '12, is growing sugar beets near Paulding. He will be connected with the Extension Department throughout the winter.

S. R. Guard, '12, former editor of this magazine, has an excellent position on the editorial staff of the Breeders' Gazette. He has been reporting several of the state fairs and spent fair week in Columbus with that object in view.

T. G. Phillips, **C. B. Clevenger**, and **Earl Jones**, all of the class of 1912, spent the summer doing graduate work in the agricultural chemistry department.

Geo. Worman, '12, has a position in the animal husbandry Extension Department maintained by Swift & Company of Chicago.

Byron Hendrix, '09, is a chemist in the U. S. Department of Agriculture at Washington.

C. N. Breese, who was enrolled in the Ag. course from '97 to '00, and a member of the '98 football team, is engaged in dairy farming in Allen County. He is Secretary of the Allen County Ohio State organization.

G. Roy Crumrine, who spent three years at Ohio State, is engaged in farming and the poultry business in Ashland County.

W. B. Smith, who was an undergraduate in the Ag. department for two years, is farming at Sharpsburg, Ohio.

H. P. Dutton is engaged in dairying at Hockingport, O.

F. C. Gove, who was at State in '97, is manager of the creamery at Russellville, Brown County.

Fred Estle and R. T. Smith are tilling the soil in Clark County.

W. N. McKay, who was enrolled at Ohio State from '97 to '99, is a farmer in Clinton County and very much interested in the alumni movement at the University.

Thomas K. Finlay, B. O. Stingel, and O. C. Alleshouse are operating farms in Coshocton County.

H. B. Crall, Ex-'06, is farming in Crawford County.

J. A. Chenoweth, who studied agriculture at Ohio State in '05 to '07, and also at Cornell, is owner of Forest Park Farm, near Greenville, Darke County. He is raising pure-breed Shropshires and breeding heavy draft horses and roadsters.

H. E. McEowen, who spent two years in the engineering course at the University, is farming in Darke County.

O. A. Allen, who spent three years at State and who was better known as "Red" among his teammates on the track team, and other friends, is farming in Fayette County.

Elliott L. Gyger, '96, is city editor of the Alliance Daily Review.

Vernon L. Wildermuth, '09, who has been with the U. S. Deptment of Agriculture for several years, is located at Tempe, Arizona. He has charge of the Entomological laboratories and a recent appropriation of the Arizona legislature will allow a considerable increase in equipment and number of assistants. Mr. Wildermuth was married early last summer.

L. H. Goddard, C. E., '92, who is chief of the department conducting farm management investigations and an agricultural survey of the state, reports among other things that there is at least one abandoned church in over 400 townships in the state.

Robert B. Stolz, '12, has been appointed instructor in the Department of Dairying. Mr. Stoltz, it will be remembered, took unto himself a wife immediately following the commencement exercises last June.

A. B. Johnson, '14, has recently been elected to the American Entomological Society. This is an honor not often received by an undergraduate.

Chas. C. McCoy, one of the patriachs who attended the University in '89 to '88, is a farmer and stockman in Fayette County.

J. B. Elliott, who spent two years at State, is farming in Defiance County.

CURRENT AGRICULTURAL LITERATURE

COMMENTS AND CRITICISMS ON CONTEMPORARY CONTRIBUTIONS

“The Farmer of To-Morrow” is the title of a series of articles now running in Everybody’s Magazine, the first of the series appearing in the August number.

When I first read hurriedly through this article I said to myself, “There is more real, fundamental, rural economics embodied therein than is offered by a whole college course. Apparently the more real, fundamental, rural economics foundation of present-day agricultural conditions and the article deserves a more careful reading.”

A second reading showed Mr. Frederick I. Anderson’s reasoning to be clear and concrete and many economic principles are exceedingly well presented. But we fear that in at least one instance he has become hopelessly misled and entangled in the ever threatening snare of general averages. Thus when he speaks of one hundred and fifty dollar land in Iowa producing on the average fourteen dollars worth of corn for acre he is clearly in error and, with this false assumption as a basis, must of necessity arrive at a false conclusion concerning the financial status of the owner of the farm.

Notwithstanding an occasional inconsistency of the kind cited, Mr. Anderson’s article is very instructive and the succeeding installments are awaited with much interest.

Mr. E. H. Grubb, of Colorado, and Mr. W. S. Guilford, of California, are

co-authors of a somewhat pretentious volume on the subject, “Potatoes.” The book consists of some five hundred pages, is published by Doubleday, Page & Co., and is illustrated in their usual inimitable fashion. Mr. Grubb, it will be remembered, was sent to Europe several years ago by Secretary Wilson, of the Department of Agriculture, to undertake certain investigations concerning potatoes and is well qualified to write of European conditions.

An English book of recent publication which should prove of interest to agriculturists is entitled, “Rural Denmark,” and is written by Rider Haggard, perhaps better known as an author of fiction. The author deals in a very simple manner with conditions and affairs as they exist in that strictly agricultural nation, Denmark. Necessity was the power which forced the Danes to adopt certain methods and institutions which have since proved of great value and which might profitably be copied by Americans. The chapters on co-operation are especially instructive and interesting.

A Government publication that should prove of interest to all is a bulletin entitled “Agricultural Opportunities,” which is being issued for free distribution by the Division of Information of the Bureau of Immigration and Naturalization, Department of Commerce and labor.

Each State is discussed briefly under the following headings: Climate, surface, and soil; irrigation and dry farming (where they are practiced to any extent); principal crops; stock raising; prices of farms and inducements to settlers; farm expenses; general and special inducements.

At the end of each article is given the address of the State official who can furnish additional information with respect to his particular State. The bulletin itself is based on information furnished to the Division of Information by officials of the States described, supplemented by data secured from publications of the United States Bureau of the Census and the United States Reclamation Service, and from other official sources.

The leading article in the Breeder's Gazette for April 14th comes from the pen of Samuel R. Guard, former editor of this magazine. In this article Mr. Guard not only exhibits his usual free and graceful style of composition,

but brings home in a forceful yet pleasing manner many truths concerning the management of "Local Fairs That Educate and Inspire," over which some fair managers of our acquaintance might well ponder.

He particularly depores the absence at the local fair of the friendly rivalry among the various members of a neighborhood (as well as among the various members of a family) in exhibiting the ordinary, common, farm products—not forgetting the pies and breads and cakes that mother can **still** make if she wants to. He believes that the "professional" exhibitor and the exhibitor who shows purchased goods have driven the ordinary, rural competitor from the field.

The American Farm World, for many years published at Augusta, Me., has suspended and their rather large subscription lists have been taken over to the Wilmer Atkinson Publishing Co., the owners of the "Farm Journal."



ANSWERED BY EXPERTS

Questions addressed to Dept. D, Agricultural Student, will be turned over to the particular faculty member most capable of answering, and question and answer will be printed in succeeding number of "The Agricultural Student". Questions will be answered by mail if stamped envelope is enclosed.

Floats as a Fertilizer.

What can you say as to the use of floats as a fertilizer?—E. T., Clinton Co.

Floats is the name applied to phosphate rock after it has been ground. It contains phosphorus in the form of phosphate of lime. The phosphorus present in the soil is in this form. For this reason the application of floats to a soil may not give any marked increase because the phosphorus it contains is too slowly available for the plant. However, it has been found that if floats is scattered over manure before it is applied to the field there is a marked increase in the crop. The decay of the manure helps to make the phosphorus in the floats available. Again, if the soil contained large amounts of organic matter, the application of floats might be advised since by its decay the acids formed would change the phosphorus over into a form which will dissolve in the soil water. This means that floats can be used to advantage only in connection with large amounts of organic matter. At the Ohio Experiment Station over five dollars were secured in return for every dollar invested in ground phosphate rock when applied with manure.

How Lime Benefits Soils.

In what way is lime beneficial to the soil?—R. H. A., Harrison Co.

Lime is of value to the soil because of its power to destroy acids. Perhaps it

might be better to say because of the fact that it is able to correct certain conditions in the soil which are detrimental to the growth of ordinary farm crops. Lime is of little value as a fertilizer. Most soils contain enough lime to take care of the needs of crops. The only materials lacking in most soils are nitrogen, phosphorous or potassium. None of these are found in lime. But under certain conditions it is found that clover will not do well and the ordinary sorrel tends to take its place. The clover or legume is essential to the economic maintenance of soil fertility. In order to secure good crops of the legume it has been found necessary to have a supply of lime in the soil. This lime seems to make conditions more favorable for such crops as the clovers and the reason usually assigned for its effect is that lime destroys the acid present in the soil.

Lumber for Hen Houses.

Please give me an itemized statement of the lumber required for a hen house to accommodate 100 hens.—M. E. O., Delaware Co.

It is difficult to make out a satisfactory statement of this kind as each carpenter has a different way of cutting up lumber. The dimensions of a house large enough for 100 hens would be as follows: Length, 30 feet; width, 15 feet; height in front, 7 feet 6 inches; height in rear, 6 feet 3 inches. About

one-third of the roof slopes toward the front, the remainder toward the rear. There are three windows in front, each 3 by 4 feet, and two muslin curtains, each 4 by 7 feet. The dropping board is $2\frac{1}{2}$ feet above the floor and is 5 feet wide, which affords space for four rows of perches.

Building a Silo.

What kind of material is best for a silo?—H. R. D., Knox Co.

Silage keeps well in a cement silo. The only objection to a cement silo is that the cement may draw the moisture from the ensilage, but if a good coating of fine cement is used, it will probably prevent the escape of the moisture from the silage. Stave silos generally cost less in the building, but the painting and attention after construction often makes them more expensive in the long run.

Smut in Wheat.

Please tell me what is the matter with the enclosed sample of wheat and give preventive treatment.—L. H. S., Wyandot Co.

The sample of wheat sent is affected with loose smut. Remedy: Rotate crops and treat the seed wheat, all grain vessels and grain drill box, with formalin before seeding. Use one pint or one pound of formalin to forty gallons of water. Sprinkle this solution on the seed, vessels and drill box then cover over for a few hours with old sacks or carpet.

Chicken Louse Powder.

I would be pleased to receive the formula given on the special agricultural train, for a home made louse pow-

der. Also state how to dust the hens with it.—Mrs. B. R. E., Hamilton Co.

Take $1\frac{1}{2}$ lbs. of plaster of paris or road dust and put it in a pan; then mix together $\frac{3}{4}$ pint gasoline, $\frac{1}{4}$ pint cresol. Stir the plaster of Paris while you add the liquid. When thoroughly mixed, the mixture should be dry and crumbly. Dry and sift and it is ready for use. The best way to apply it is to make a small door in a barrel which is closed at both ends. Place a few chickens and a few handfuls of the powder into the barrel; then give the barrel a few rolls; remove the chickens and repeat the dusting in a week or ten days.

Control Bitter Rot With Bordeaux.

I have some apples that are troubled with bitter rot every year. I spray with lime sulphur before the leaves open, and once after the petals drop, but these two sprayings seem to have no effect on bitter rot?—G. A. S., Licking Co.

You should spray later in the season with bordeaux mixture. Use 3 lbs. of blue stone and 5 lbs. of lime to a bbl. of water. One application should be made about June 20 to 25. A second about the middle of July and a third about the last of July. It would be advisable to add 3 lbs of arsenate of lead to the barrel at the last spraying to control the second brood of codling moth.

Be a Leader.

The necessity of greater yield leads thousands of farmers to action, but why not be a leader instead of a trailer? Sow a patch of alfalfa, build a silo, and be a leader. Every silo owner is a silo booster; ask one of them why?

Secondary Agriculture

Devoted to the Interests of Agricultural Education in High and Common Schools

In adding this new department to the *Agricultural Student*, we do so after due deliberation and consultation with men and women familiar with the needs of our schools. Our object is to be of service and help to teachers and pupils in all schools where the subject of agriculture is taught.

Each month there will be a number of articles that will deal with those subjects that may be taught in the school room. These articles will be prepared by men and women who are building up and working out a course of study in Agriculture.

We extend a welcome to our readers to use these columns and urge that teachers and pupils send in questions, to be answered, and subject for discussion, along any line of Agriculture or Rural Study.

Brief and concise accounts of what you are doing will be published if you will send them to us.

DEMONSTRATION GARDENS IN THE McARTHUR HIGH SCHOOL

Agriculture was taught in the McArthur High School for the first time last year. We wanted to rent or buy a nearby plot of ground, but did not succeed in obtaining this. Nevertheless, we were determined to have the gardens. Each student in the Agriculture class

planted a garden at home. This was made a part of the course and therefore compulsory. They were allowed to plant anything they cared to, some of the girls choosing flowers. Each child was given slips of paper to test the soil for acid and alkali. We then worked out the kind of fertilizer needed on each plot. Explanations were made and diagrams drawn showing the best ways in which to lay out gardens. The announcement was made that the class was at liberty to inspect the gardens at any time. Hence, they were kept in first-class condition all the time.

This plan of having demonstration gardens at home worked splendidly. The pupils took more interest in them and were willing to work harder because they knew they would get all the products.

As a part of the final examination in Agriculture, each pupil handed in a report of his garden, stating how much time had been spent in working it, the ways of caring for it, and the results. Although school was out in May, a large number of pupils reported that some of the crops were ready for use.

I consider this method of having demonstration gardens very satisfactory.

MAUDE DAVIS, Prin. of H. S.

Pictures and cuts of your Agricultural Class, your High School, etc., are welcome. If you know of a certain school that has done something worthy of mention, let us know about it.

ORGANIZATION OF A COURSE IN SECONDARY AGRICULTURE.

The organization of a course in Agriculture for a high school will depend a great deal upon the kind of farming community in which the school is located, the grade and equipment of the high school, and the training of the teacher.

Where a school is situated in the midst of a strong farming district, more attention can and should be given to agriculture than if it is located in a large mining or manufacturing region. It would be foolish for a school of the third grade to attempt work that only a first class agricultural high school can do. In general it may be said that only as much should be undertaken as can be done thoroughly. Too many teachers in their desire to get on the "agricultural band wagon" attempt what is beyond the ability of the pupils and the training of the teachers, and as a result their work is not as satisfactory as it ought to be. Work poorly done is sure to react not only upon the teacher, but upon the school as well, and finally upon the community. Were it not for the strong agricultural sentiment that is prevalent over the country, much of the present work in agriculture would receive a set-back that would require years to regain.

As a foundation for agricultural was, as much attention as possible should be given to Physical Geography, Botany, Zoology, Physics, and Chemistry. These subjects are just as essential for an agricultural education as the strictly agricultural subjects and perhaps even more so. The maxim, "Strive to know **Why**, for this teaches **How and When**," surely means a knowledge of fundamentals. When these fundamentals of agriculture are once at-

tained, the student has more real agriculture than oftentimes he is fully aware.

In regard to the order of presentation of the above subjects so as to get the best results in them and in agriculture as well, much will again depend upon local conditions. In general, it may be said that the first three studies mentioned should come during the first two years of the course and the latter two during the third and fourth. The strictly agricultural work should not come until the third or fourth year.

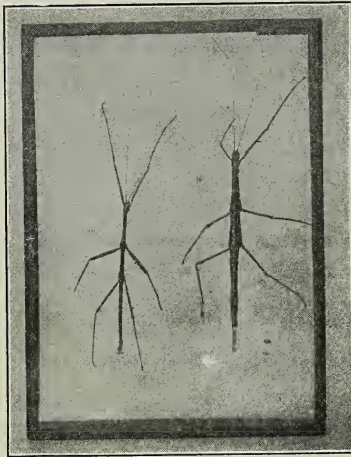
Agriculture is such a deep and broad subject that at least a year's time should be given to it in order to do satisfactory work. A good standard text, supplemented by other texts and bulletins, should be used. For a township high school located in a strong agricultural community or for a strictly agricultural high school a two-year course is deemed advisable. Instead of a single text covering the whole field, several separate texts should be used. Good texts and not beyond the ability of the average high school student can be gotten in Soil Fertility, Farm Crops, Horticulture, Dairying, and Animal Husbandry.

As a fitting climax to a well organized course some attention—perhaps a half year—should be given to the economic and sociological problems of country life. This is very important, for the heart of the whole country life problem is one of economics and sociology. The study of Rural Economics and Rural Sociology will not be found more difficult than Civics or American History and will be really the most important part of an agricultural course in a high school.

Send in questions to be answered each month.

HOW TO MOUNT INSECTS PERMANENTLY AND INEXPENSIVELY.

One of the most interesting, as well as most instructive exercises which may be carried out by agricultural students of varying ages, consists in a study of insects. While promiscuous collecting of insects by children is perhaps not advisable, still a few well selected and well mounted specimens furnish valuable material for further study and certainly make most desirable entries in the school display or ex-



SHOWING MOUNTED INSECT.

(Can be viewed from either top or bottom.)

hibit. This is especially true if specimens of the four stages of the life history of an insect of economic importance are mounted in the same frame and accompanied by a sample of the insecticide used in fighting this particular insect.

The main barrier to satisfactory work of this kind usually arises from the teacher's and student's inability to secure inexpensive, pleasing, permanent mounts. It is for this reason that I am suggesting the following method which I have used with excellent success.

First, secure some used photographic plates which may usually be obtained

at little or no cost from any photographer. Select the plates of one convenient size, say 4 x 5, and by boiling in water containing a little lye or soda, the old film may be readily removed. Next, send to the A. I. Root Co., Medina, O., asking them for circulars describing their mounting sections. These sections are of white wood and come in various sizes to fit the glass plates. They cost about one cent each. Secure some white, liquid glue and with the insect at hand (killed and set in the natural position) the mounting operation may be started.

Place one plate flat on the table and glue the wooden mounting section in place around the outer edge of the upper surface. If the insect is quite thick, glue another section upon the first. Arrange the insects as desired within the frame and attach to the glass plate by a drop of glue. Glue the second plate upon the top of the box-like structure now formed. Complete by pasting a strip of passe-partout around the edge, folding over a short distance upon the top and bottom. The insect is now in a position to be viewed from all sides and, if the precaution be taken to place a drop of carbon bi sulphide inside the frame just before completion, the specimen should keep in perfect condition indefinitely.

MAKING HIGH SCHOOL AGRICULTURE INTERESTING.

Interest is absolutely essential to a successful high school course in Agriculture. For, being an adolescent, the high school pupil is exceptionally alert. His whole being demands a field in which he can think and feel keenly. To him thus far farming may have been routine and drudgery and new phases must be revealed if his attitude is to be changed. As he is now more impressionable than at any other stage in his

whole career, our chief business should be to implant those standards and ideals which are to determine his conception of agriculture and his attitude toward it. These fundamentals will most readily furnish the field of activity which he craves.

Let us first show him, then, by several striking examples, that plants and animals are subject to much variation and that they are thus capable of much modification and improvement. Also, let the class bring in or describe as many other examples as possible. Emphasize the economic value of this principle, showing how man, by controlling this variation, can advance his own interests or gratify his own tastes. From this it is a natural step to a consideration of the factors and agencies involved in such control. Let each student make lists of these factors, one for plants and one for animals, the lists to be discussed in the class room. Then follows a study of each factor, selecting the more familiar first, as for example, "Water Supply for Plants."

Have all the bulletins obtainable and have them well classified and arranged, and have as complete library facilities as possible. In studying factors of control assign topics to be written up after careful reading and see to it that the articles of special merit get into the local papers. Experiments must be introduced wherever practicable. Such experiments as the germination test for corn, the effect of transplanting on plant growth, and the effect of short rations on the moulting time of chickens, should appeal even to the most indifferent pupils. Occasional field trips are important, but the class must be kept together, and a report of the trip required of each member.

The artistic and poetic phases of agriculture must not be neglected. Give

these application by way of floriculture and landscape gardening. By means of pictures, observations, and descriptions arouse an interest in attractive surroundings. Call attention to the higher market value of an attractive place and start a campaign against sign painting on farm and village property. These things will attract the attention of the local minister, the real estate agent, and the paint dealer, and a general "clean up" movement should result.

Each student should be encouraged to conduct at home some line of experimental work best suited to his interests and surroundings. Some can experiment with chickens, some with grafting, others with fertilizers, etc. Each should make a full report for the class and, if much work of the kind can be done, a school exhibit for the benefit of the public is a profitable enterprise.

Work along these lines should ultimately lead to the organization of a local agricultural society, with regular meetings at a place where all will feel free to attend. There should be at each meeting a program consisting of music, the discussion of some previously announced topic of local concern, and a paper or address by some resident of the section on the agricultural topic best known by him. Following the program there should be an hour of free social intercourse and merry-making. Such an organization, if well managed, must result in a general exchange of ideas and information and at the same time will serve to promote a neighborhood spirit and overcome the social stagnation which infests so many communities.

In order to accomplish results along the lines suggested, the teacher must have both training and love for the work and must know his community and be alive to its needs. There are

also some phases of the work that are best obtained in the usual academic way and for these a good text should be in the hands of the pupils. But if the pupil once gets to thinking that the text contains all he needs to know about the subject, he has lost the proper point of view and it will be a much greater problem to maintain his interest.

A SCHOOL-YARD OBJECT LESSON.

On our school-yard, which was a very large one, there was a plot of ground which would produce nothing but wire grass. Clover had been planted, but it failed to grow. So the pupils of the eighth grade dug up three large plots. The soil was tested with litmus paper and found to be very acid. They found

out how much lime would be needed to correct this acidity. On one plot the needed amount of lime was added, on another about half the proper amount, on another none. Clover was planted. The same care was given to all three plots. Every child made a diagram showing what had been done. When school closed, no seed had come up, but every child looked forward with interest to the results of this experiment. Not one will forget the lesson of how to make clover grow on an acid soil.

MAUDE DAVIS,
Prin. of H. S., McArthur, O.

If you desire immediate answers, enclose stamped envelope and we will endeavor to reply at an early date.

The following topics will be found suitable for the autumn months:

1. Composition of Soil.
2. Relation of Soil to Water.
3. Fertilizers.
4. Seeds and their Germination.
5. Selecting and Storing of Seed Corn.
6. Tree Planting.
7. Weeds.
8. Insects.
9. Fruits.
10. Pastures.
11. Agricultural Clubs.
12. Storing Fruit and Grains for Winter.

The following are valuable farmers' bulletins for autumn months:

- No. 313. Corn, Harvesting and Storing.
- No. 289. Corn, The Production of Good Seed.
- No. 22. Farm Animals, the Feeding of.
- No. 187. Farm Lands, Draining of.
- No. 203. Fruits, Preserves and Jellies, Canned.
- No. 66. Meadows and Pastures.
- No. 292. Silos, Cost of Filling.
- No. 32. Silos and Silage.
- No. 134. Tree Planting in Rural School Grounds.
- No. 28. Weeds, How to Kill.

WITH THE BREEDER

NOTES OF INTEREST AMONG THE FLOCKS AND HERDS

The Ohio Shropshire Association has been making remarkable progress since its organization two years ago. At that time there was no classification for Ohio bred Shropshires and they received little distinct recognition. At the present time, they have six prizes in all the classes at the Ohio State Fair comprising a total prize list of more than \$200. In addition to this the American Shropshire Association has increased the special premium from \$50 to \$100 and confined same to Ohio bred sheep.

Two years ago but three exhibitors showed Shropshires. This number has increased to nine at the present time and from all indications, when the present season closes twelve to fourteen exhibitors will have shown this breed of animals.

At the January meeting of the Association, L. B. Palmer, of Pataskala, a former Ohio State student, was elected president. Ralph A. Postle, of Camp Chase, also an Ohio State student, was chosen vice president, and G. E. Stallsmith, of Urbana, secretary.

The Shropshires are certainly looking up in Ohio and anyone contemplating the purchase of breeding stock will find an excellent selection among the pens of our advertisers.

Mr. E. O. Bradfute, of Cedarville, recently sold a very fine Aberdeen Angus bull to a prominent breeder in Virginia.

GOOD-E-NUFF AGAIN DEAD.

The famous Duroc-Jersey boar, Good-E-Nuff-Again, owned by Wm. H. Robbins, of Riverdale Farm, Springfield, died early in July. He was five years old and had been shown but twice, winning first prize as junior yearling in 1909 at the Ohio State Fair, and both first and championship as aged hog in 1910.

He was the sire of the prize winning boar at Ohio State Fair in 1911, as well as of two or three of the prize winners at the 1911 Kentucky State Fair.

Good-E-Nuff-Again was probably as well known throughout the state as was any Ohio boar.

Among the hog breeders it is a matter of some conjecture as to why the southern markets for pure bred stuff, which were so active a year or two ago, have fallen off so noticeably in their demands for northern stock. Many believe that the southern stock farms, founded recently, are beginning to supply the local demands.

Elmer Drake, formerly with E. S. Kelly, of Whitehall Farm, and later with Thomas Johnson, at Columbus, is now managing the herds of Chas. F. Sprague, at Indianwold Farm, near Lima,

Mr. Frank Pontius, near Groveport, has purchased several fine Holsteins and intends to establish a large herd.



September News Notes



Visitors to the Ohio State Fair are cordially invited to visit the University during their stay in Columbus. Guides will be stationed in the buildings to direct and explain.

Farmers' Reading Course and Home Makers' Reading Course bulletins will be published monthly this year. These bulletins will be sent to all those who request them.

A Farmers' Week will be held at the University next winter for the first time in its history. The plan of such a week is to give the farmers and their wives a chance to take a week's training in Agriculture and Domestic Science at a time when they can leave home. Frequently many rural folks express a desire to attend the short winter course here but cannot remain here eight weeks. The week's training will cover the fundamentals and permit of a greater number of our Ohio people getting acquainted with the state's center of learning. This will also help the University.

Similar courses have long been given in other states with success. Figures from those of longest standing show increased attendance and more thorough training each year.

The College of Agriculture will make an educational exhibit at the American Land and Irrigation Exposition to be held October 15 to November 2, at Madison Square Garden, New York City.

The September number of the Extension Bulletin will contain an article entitled "Plant Food," written by M. A. Bachtell. This is a subject dealing with Soil Fertility. Mrs. E. P. Foulk has also written a special bulletin to be distributed during the State Fair, entitled "Handy Kitchen Equipment."

Many important promotions were made in the University faculty at a recent meeting. Professor, associate professor, assistant professor, instructor, assistant instructor and fellow are the ranks in the faculty naming them in descending order.

Three assistant professors in the physics departments have been made full professors, S. J. Barnett, F. C. Blake, and R. F. Earhart.

New full professors in the Arts College with their departments are: William L. Graves, English; F. A. McKenzie, economics and sociology; O. C. Lockhart, economics; B. A. Eisenlohr, German; H. F. Staley, ceramic engineering; J. R. Withrow, chemistry, and E. F. Coddington, mechanics.

New assistant professors are H. F. Walradt, economics and sociology; Robert O. Bosey, German; J. A. Wilkinson, chemistry, and Freeman S. Jacobi, poultry husbandry.

Those raised to instructorships are Otto F. Bond, romance languages; C. E. Boord, chemistry, and J. E. Shepardsen, electrical engineering.

Miss M. C. Hathaway will instruct in domestic art in the domestic science department. Edgar M. Allen will help care for the large classes in anatomy and physiology; D. L. Kays will be instructor in animal husbandry, and J. N. Shoemaker and Willis Guard, both this year's graduates, will be assistant instructors in the veterinary college.

Dean H. C. Price and Prof. W. R. Lazenby will return early in September after a year's leave of absence to study agriculture in Europe. Prof. Herbert Osborn, who spent the summer abroad, will return at the same time.

Miss Carolyn Breyfogle, formerly of Wellesley College, has been elected Dean of Women. The desirability of creating such a position has been apparent several years. Miss Breyfogle occupied a chair at Wellesley for five years and comes with recommendations of exceptional ability for her new position.

C. D. Steiner, who until lately was connected with the Extension Department here, leaves to take up the direction of the Boys' and Girls' Agricultural Clubs of Kansas. These clubs are conducted by the Extension Department of the Kansas Agricultural College and have proven a success in every way in that state. At present there are about 300 such clubs and, with interest increasing with the coming of a new man, it is likely that the state will be provided in future years with tillers of the soil. Mr. Steiner's good nature leans toward this work and with his training in the College of Agriculture, he will undoubtedly make good.

The date set for the opening of the new library cannot be definitely given as yet. Contractors give it as November 1, but the formal opening will probably be nearer January 1.

For problems in Agricultural arithmetic write for Extension Bulletin published by the Ohio State University Agricultural College, Columbus.

Prof. Alfred Vivian left July 1 for his "Farmer's trip around the world." His trip will extend over a period of fourteen months, during which time he will visit England, Germany, France, Italy, Egypt, Ceylon, India, China, Japan and Hawaii.

It is his plan to give the agricultural conditions of these countries the most critical attention. Other sights will be seen, but more secondarily. He will endeavor in all places to study how to better farm interests and in India and China he will aid the governmental agricultural leaders to solve some of their problems, especially of the maintenance of fertility.

Prof. Vivian will write two letters a month for the Ohio Farmer, and it will be interesting to follow him in his study of foreign agriculture.

Prof. H. W. Vaughn will not return this year to resume his teaching in the Animal Husbandry Department. At present he is on a farm in the Adirondacks. He is reported to be enjoying life there very much.

Five hundred and sixty-two students attended the Summer School at the University this year. Of this number 54 were engaged in the study of agriculture. This is a decrease from last year, but the course here is more advanced than that at other summer schools of agriculture and no text-books are used.

Courses were given in Farm and Crops, C. J. Grant; Soil Fertility, F. E. Bear; Horticulture, J. N. Gourley; Dairying, Oscar Erf, and Agricultural Education, G. A. Bricker.

Of the total number in the school over 100 had college degrees and 13 were college instructors.

PLANS FOR NEW DORMITORIES.

After carefully considering suggestions at the early summer meeting of the Board of Visitors of the Ohio State Alumni Association, it was decided that Dormitories were the greatest need of the University and a plan was therefore formulated for their attainment, and submitted to the Board of Trustees.

The Trustees were much gratified at this indication of interest on the part of the Alumni and heartily pledged their support to the project. They appointed Dr. Thompson and F. E. Pomereene committee to "confer with the Board of Visitors. And in order that the said plans may be given a definite and practical form the committee is to confer with the Attorney General as to the powers of the Trustees to enter into an agreement with the Alumni Association and to prepare a proposed form of agreement with said Association."

The Attorney General has approved the power of the Trustees to enter into this agreement and the plan as outlined is as follows:

It is proposed to build a quadrangle 450x170 to accommodate about 450 students. The units will cost about \$20,000, and each will have room for 32 students. The present Ohio Union will be the north side of the quadrangle.

Funds are to be raised by a bond issue secured by a deed of trust covering the buildings and the contract with the Trustees, granting the right to maintain and operate the Dormitories, the income from which shall be used for the payment of expense of maintenance, repairs, interest on bonds at 5%, and a sinking fund to repay the bonds, on completion of which the Dormitories become the property of the University.

This furnishes an opportunity to interest every alumnus actively in his Alma Mater. It is not a proposal to donate money, but to invest money, and each will have the pleasure of seeing his money work out a project that has the combined endorsement of Trustees, Faculty and Alumni.

It is of the greatest importance, and none appreciate it more than University men, that the under-graduate be brought within the positive and well directed influence of the faculty. Much is lost to college students who leave the class room and pass into localities that the University atmosphere does not reach. The associations and friendships of college years are one of the most valuable features of a college education, and these should be formed in the Dormitories, Dining Commons and on the Campus. That the leading universities appreciate this is shown by their complete system of dormitories.

In the comparatively short time since the above mentioned plans have been developed more than \$25,000 have been subscribed. This is sufficient to build and equip the first unit and the project will no doubt be carried out in its entirety if this first unit proves to be the boon expected.

This is certainly a laudable enterprise and speaks volumes for the loyalty and enterprise of the Alumni Association.

A list of the Board of Visitors follows: Dr. A. B. Townshend, President; Ralph D. Mershon, Secretary; John F. Cunningham, Mark Francis, Chas. W. Burkett, William R. Malone, Charles C. Sharp, Prof. Wallace C. Sabine, Frank W. Rane, Joseph S. Myers, George H. Matson, C. E. Skinner, F. L. O. Wadsworth, Prof. Horace L. Wilgus, Mrs. Chas. M. Wing.

The first issue of the Ohio State University Monthly appeared last July. It replaces the quarterly and will be published monthly in the interest of Alumni and former students.

The Dairy Department has, for the first time in several years an extended display of their work at the Ohio State Fair in the new dairy building.

Several members of the Extension Department gave instruction in different phases of agriculture at the various summer schools held over the state this year.

Crop conditions on the University Farm are good. One hundred and fifty acres are in corn, which will produce a bumper crop from the present outlook. Twenty-five acres of excellent timothy hay was made. Twenty-five acres are in soy beans. Last year's wheat crop was killed during the winter.

Are you alive? Then let others know it. It pays to advertise.

Sixteen months will be required to complete the new archaeological building which has been started on the campus.

Agricultural Society.

In the 1911-12 program some of the best known agriculturists in the country made addresses before the society. Next year it is sure to be better.

Horticultural Society.

This organization means as much to students of Horticulture as water and oil does to an engine.. Watch for the announcement of the first meeting.

The Saddle and Soirloin Club.

Last spring this club held a horse show on the campus which, according to judges, was one of the best they ever saw. Other stunts have been just as good. Those interested in Animal Husbandry should support the club this coming school year.

Townshend Literary Society.

Cases have been recorded when many students outside of the College of Agriculture joined this society for the training in literary ventures and enjoyable social events. Why, then, should not all agricultural students support this organization? You will be welcomed at the first meeting.

Agricultural Extension Schools.

Following are the 1912-13 dates of Agricultural Extension Schools and the counties in which they will be held:

Nov. 11, 1912—Gallia.

Nov. 18—Highland, Medina, Adams.

Nov. 25—Morgan, Ashland, Monroe.

Dec. 2—Belmont, Allen, Portage.

Dec. 9—Tuscarawas, Preble, Harrison.

Dec. 16—Geauga, Champaign, Coshocton.

Dec. 23—Cuyahoga, Fayette, Fulton.

Dec. 30—Trumbull, Montgomery, Butler.

Jan. 6, 1913—Columbiana, Ross, Ash-tabula.

Jan. 13—Stark, Delaware, Wayne.

Jan. 20—Licking, Union, Darke.

Jan. 27—Greene, Harding, Hocking.

Feb. 10—Huron, Hancock, Knox.

Feb. 17—Williams, Defiance, Shelby.

Feb. 24—Wood, Putnam, Muskingum.

March 3—Logan, Van Wert, Lorain.

March 10—Sandusky and Lake.

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Fig. 1345

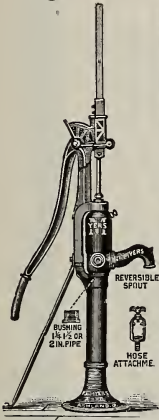


Fig. 1287

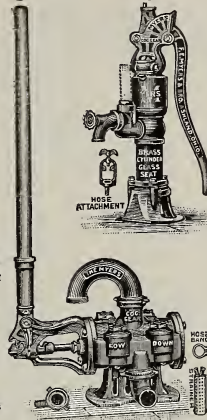


Fig. 1384



Fig. 1160



Fig. 333



Fig. 1138

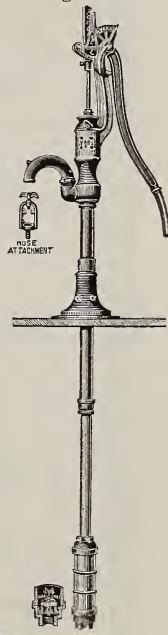


Fig. 813

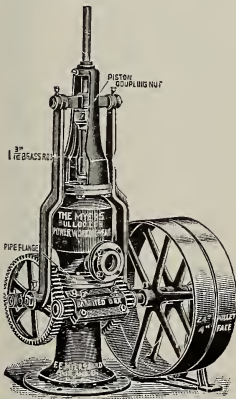
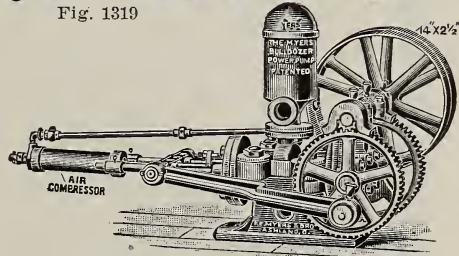


Fig. 1319



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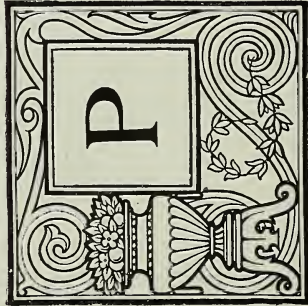
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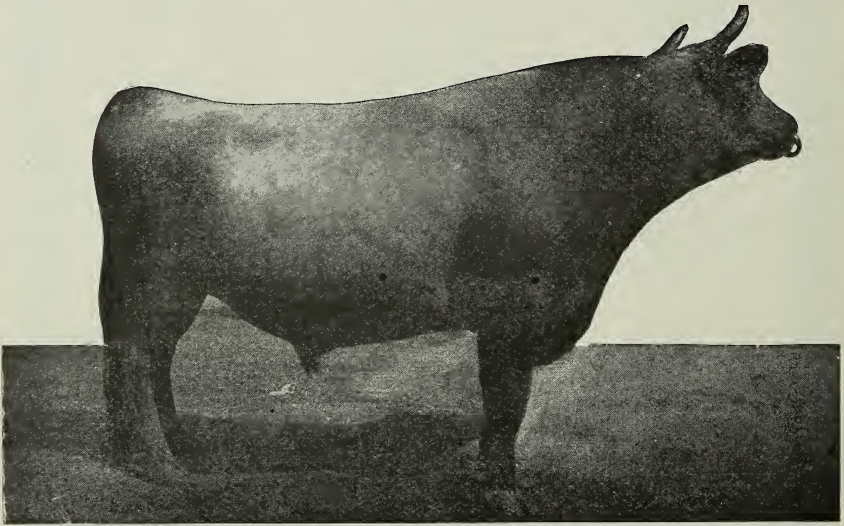
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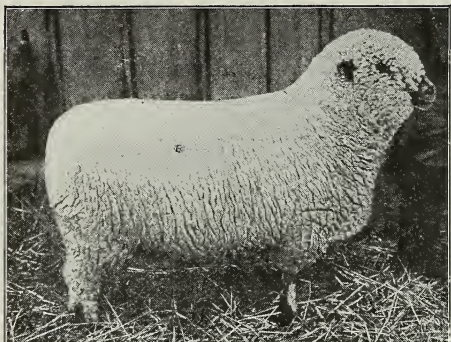
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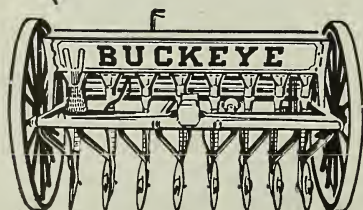
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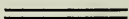
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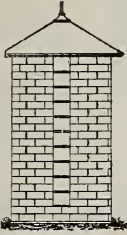
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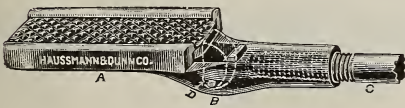
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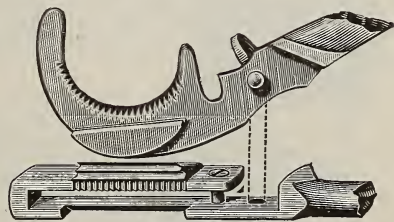
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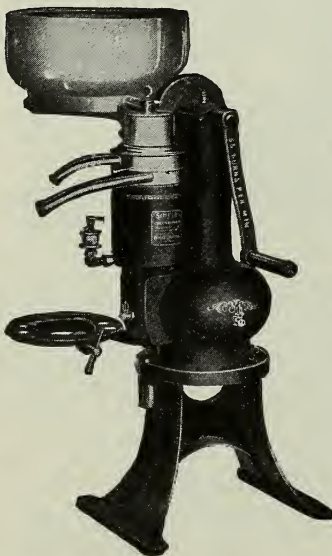
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